

# PASMISS 2023 & TSESS 6<sup>th</sup> Annual Meeting

July 13 (Thu) - July 15 (Sat)

 Tainan, Taiwan  
Formosa Hotel - International Banquet Hall.

Program Book

Taiwan

# Baxter

## Simplified Patient Positioning For Lateral Access Spine Surgery

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Time savings over traditional patient movement. Fewer people and less equipment needed for lateral to prone transitions.



#### Peace Of Mind

Secure and controlled movement of the patient. Custom drawsheet keeps the patient harnessed in.



#### Simplified Procedure

Transition from lateral to prone with just a few simple steps. No need to remove the patient from the table.

  
**L2P**  
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**CHC** CHIU HO  
MEDICAL SYSTEM



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## Welcome Message

Minimally invasive spine surgery has revolutionized the way we approach spinal disorders. It has brought about tremendous benefits, including reduced surgical trauma, faster recovery times, and improved patient satisfaction.

Our annual meeting serves as a platform for sharing knowledge, promoting collaboration, and pushing the boundaries of innovation. Throughout this event, we will have the opportunity to engage in thought-provoking discussions, attend informative sessions, and witness cutting-edge technologies in action. It is a time for us to learn from one another, exchange ideas, and ultimately improve patient outcomes.

I would also like to extend my gratitude to the organizing committee, the speakers, participants and the sponsors for their contributions in making this event possible. Without their support and dedication, this gathering of minds and talents would not have been possible.

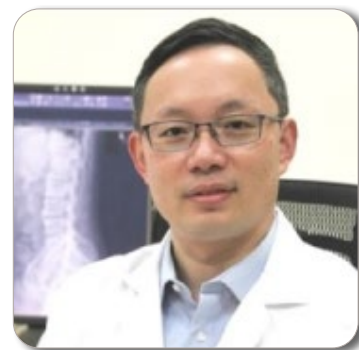
In conclusion, I am filled with enthusiasm and anticipation for the days ahead. Let us seize this opportunity to connect, learn, and inspire one another. Together, we can make a lasting impact on the field of minimally invasive spine surgery and ultimately improve the lives of our patients.

Thank you and enjoy the PASMISS & TSESS 2023 Annual Meeting!

*Keng Chang Liu, MD, PhD  
Buddhist Dalin Tzu Chi Hospital, Chiayi, Taiwan  
President, PASMISS & TSESS 2023*



**President: Keng Chang Liu, MD, PhD**  
Buddhist Dalin Tzu Chi Hospital, Chiayi



**Secretary General: Cheng Li Lin, MD, PhD**  
Nation Cheng Kung University Hospital, Tainan



## Organizing committee of 2023 PASMIS and TSESS

**Chairman** 劉耿彰 Keng-Chang Liu

**Secretary General** 林政立 Cheng-Li Lin

### Scientific committee (PASMIS)

**Chair** 林政立 Cheng-Li Lin

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陳衍仁 Yen-Jen Chen	楊昌綦 Chang-Chen Yang	游敬孝 Ching-Hsiao Yu	劉原輔 Yuan-Fu Liu	曾效祖 Shiao-Tzu Tzeng
王子康 Tzu-Kang Wang	楊士階 Shih-Chieh Yang	陳昆輝 Kun-Hui Chen	沈文哲 Wun-Jer Shen	黃儀鴻 Yi-Hung Huang

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周世祥 Shih-Hsiang Chou	高明見 Ming-Chien Kao	曾峰毅 Fon-Yih Tsuang	江長蓉 Chang-Jung Chiang	李孔嘉 Kung-Chia Li
趙國華 Kuo-Hua Chao	簡瑞騰 Jui-Teng Chien			

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盧郁仁 Yu-Jen Lu	曾準 Chun Tseng	簡愷廷 Kai-Ting Chien	謝岳穎 Yueh-Ying Hsieh	黃裕涵 Yu-Han Huang
孫立偉 Li-Wei Sun	廖仁傑 Jen-Chieh Liao	鍾玉軒 Yu-Hsuan Chung	吳育綸 Yu-Lun Wu	張凱勝 Kai-Sheng Chang
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### Advisors

陳博光 Po-Quang Chen	李政鴻 Cheng-Hung Lee	張明超 Ming-Chau Chang	黃聰仁 Tsung-Jen Huang	呂衍謀 Yen-Mou Lu
吳興盛 Shing-Sheng Wu	傅再生 Tsai-Sheng Fu	陳英和 Ing-Ho Chen	于載九 Tzai-Chiu Yu	林乾閱 Chien-Min Lin
沈焯祺 Chiung-Chi Shen	楊曙華 Shu-Hua Yang	朱大同 Da-Tong Ju	林啟禎 Chii-Jeng Lin	



## Program at a Glance

### Jul. 13 (Thu)

Time	
16:00-17:30	PASMISS Board Meeting
18:00-	<b>Welcome Reception</b>

### Jul. 14 (Fri)

Time	1F Ball Room B	1F Ball Room C
08:00-17:00	<b>Registration</b>	
08:30-09:30	Plenary Lecture: History and Current Status of Minimally	
09:30-10:00	PASMISS Opening Remark & Group photo	
10:00-10:30	<b>Coffee Break</b>	
10:30-11:30	Computer-Aid Surgery / Navigation and Robotics	Osteoporotic Vertebral Compression Fractures
11:30-12:30	Best Paper Competition	Free Papers 1
12:30-13:00	Luncheon Symposium	Luncheon Symposium
13:00-13:30	Luncheon Symposium	Luncheon Symposium
13:30-14:30	Adult Spinal Deformity (ASD)	Tumor & Infection
14:30-15:30	Free Papers 2	Free Papers 3
15:30-16:00	<b>Coffee Break</b>	
16:00-17:00	Degenerative Spinal Diseases	Cervical Spine
17:00-18:00	Free Papers 4	Free Papers 5
18:30-	<b>Gala Dinner</b>	

### Jul. 15 (Sat)

Time	1F Ball Room B	1F Ball Room C
08:00-17:00	<b>Registration</b>	
08:00-08:36	Degenerative Spondylolisthesis	Concepts and Pitfalls for Endoscopic Spine Surgery
08:36-09:24	Degenerative Scoliosis	
09:24-10:00		TSESS Opening & Group photo
10:00-10:30	<b>Coffee Break</b>	
10:30-11:50	Free Paper 6	Advancement of Endoscopic Surgery
11:50-12:20	Luncheon Symposium	Luncheon Symposium
12:20-13:00	PASMISS Closing	
13:00-13:30	<b>Coffee Break</b>	
13:30-14:30	Video Demonstration: How a Master Does	
14:30-15:30	Video Contest	
15:30-16:00	<b>Coffee Break</b>	
16:00-17:00	Video Contest Awards	
17:00-16:30	TSESS Closing	
18:30-	<b>Banquet</b>	



## Jul. 14 (Fri) ▶ 1F Ball Room B

## Scientific Program

Time	Topic	Speaker
08:00-	Registration	
<b>08:30-09:30 Plenary Lecture: History and Current Status of Minimally Invasive Spine Surgery (MISS)</b>		
<b>Moderator :</b> Po Quang Chen (Taiwan), Shinichi Konno (Japan), Jae Sung Ahn (Korea)		
08:30-08:45	MISS in Taiwan	Ruey Mo Lin (Taiwan)
08:45-09:00	MISS in Japan	Koichi Sairyō (Japan)
09:00-09:15	MISS in Korea	Seok Woo Kim (Korea)
09:15-09:30	Discussion	
<b>09:30-10:00 PASMISS Opening Remark &amp; Congratulatory Messages</b>		
09:30-10:00	<b>Po Quang Chen</b> Former President, Taiwan Spine Society Professor, PQ Chen MD & Associates	
	<b>Chii Jeng Lin</b> President, Joint Commission of Taiwan Professor, National Cheng Kung University Hospital Orthopedic Association	
	<b>Cheng Hung Lee</b> President, Taiwan Spine Society Professor, Taichung Veterans General Hospital	
	<b>Jwo Luen Pao</b> President, Taiwan Society of Minimal Invasive Spine Surgery Professor, Far Eastern Memorial Hospital	
	<b>Jui Teng Chien</b> Superintendent, Buddhist Douliou Tzu Chi Hospital	
10:00-10:30	<b>Keng Chang Liu</b> Director, Division of Spine Surgery, Department of Orthopedics, Buddhist Dalin Tzu Chi Hospital, Taiwan President, PASMISS & TSESS, 2023	
	<i>Coffee Break</i>	



## Jul.14 (Fri) ▶ 1F Ball Room B

## Scientific Program

Time	Topic	Speaker
<b>10:30-11:30 Computer-Aid Surgery / Navigation and Robotics</b>		
<b>Moderator :</b> Tsung Jen Huang (Taiwan), Jae Chul Lee (Korea), Chiung Chyi Shen (Taiwan), Re Wen Wu (Taiwan)		
10:30-10:40	Experiences in Computer Navigation Assisted Lumbar Spine Surgery	Ming Chau Chang (Taiwan)
10:40-10:50	Our Experience in Mazor Robot	Yen Mou Lu (Taiwan)
10:50-11:00	The Accuracy of PPS Insertion Under the Support of Spinal Robot: Does the Length of Experience of Spinal Surgery Have Any Influence on It ?	Takanori Saito (Japan)
11:00-11:10	Getting Started with the Mazor X and How It Changed My Practice	Jacob Yoong Leong Oh (Singapore)
11:10-11:20	Lessons from 300 Robotic Spinal Surgeries using Globus' ExcelsiusGPS System	John Choi (Australia)
11:20-11:30	Discussion	
<b>11:30-12:30 Best Paper Competition</b>		
<b>Moderator :</b> Hyoung Yeon Seo (Korea), Hiroshi Yamada (Japan), Naresh Kumar (Singapore), Ruy Mo Lin (Taiwan), Shrinivas Rohidas (India)		
12:30-13:00	Luncheon Symposium (Globus/Prospine) Innovation in Spine Surgery	
13:00-13:30	Luncheon Symposium (Globus/Prospine) Expandable Interbody Spacers in MIS Spine Surgery	John Choi (Australia)
<b>Moderator :</b> Tsai Sheng Fu (Taiwan)		
<b>13:30-14:30 Adult Spinal Deformity (ASD)</b>		
<b>Moderator :</b> Kazuo Nakanishi (Japan), Jae Sung Ahn (Korea), Hee Kit Wong (Singapore), Wun Jer Shen (Taiwan)		
13:30-13:40	Updates on MISS Techniques for Adult Spinal Deformity (ASD) Correction	Cheng Hung Lee (Taiwan)
13:40-13:50	Complication Management and Prevention of MISS for ASD	Jae Chul Lee (Korea)
13:50-14:00	I Choose Anterior Approach for Adult Spinal Deformity	Tzai Chiu Yu (Taiwan)
14:00-14:10	MIS Circumference Adult Deformity Surgery	Gabriel Liu (Singapore)
14:10-14:20	Adult Spinal Deformity - Strategies for Treatment	Po Liang Lai (Taiwan)
14:20-14:30	Discussion	





## Jul.14 (Fri) ▶ 1F Ball Room C

## Scientific Program

Time	Topic	Speaker
<b>10:30-11:30 Osteoporotic Vertebral Compression Fractures</b>		
<b>Moderator :</b> Hiroshi Yamada (Japan), Shih Chieh Yang (Taiwan), Luthfi Gatam (Indonesia)		
10:30-10:40	I Prefer Vertebroplasty over Kyphoplasty	Chung Hwan Kim (Korea)
10:40-10:50	I Prefer Kyphoplasty	Shih Hsiang Chou (Taiwan)
10:50-11:00	I Prefer Fusion Surgery	Warat Tassanawipas (Thailand)
11:00-11:10	The Role of Spine Endoscopic Surgery in Osteoporotic Vertebral Compression Fractures	Meng Huang Wu (Taiwan)
11:10-11:20	Diagnosis and Treatment of Painful Cemented Vertebrae	Yen Jen Chen (Taiwan)
11:20-11:30	Discussion	
<b>11:30-12:30 Free Papers 1</b>		
<b>Moderator :</b> Yung Park (Korea), Yen Mou Lu (Taiwan), Yutaka Hiraizumi (Japan)		
12:20-12:30	Discussion	
12:30-13:00	Luncheon Symposium (Baxter) Haemostasis in Endoscopic Spine Surgery	John Choi (Australia)
<b>Moderator :</b> Cheng Li Lin (Taiwan)		
13:00-13:30	Luncheon Symposium (J&J DePuy Synthes) ALIF-Lordosis Matters: Why and How We Choose	Kun Hui Chen (Taiwan)
<b>Moderator :</b> Cheng Hung Lee (Taiwan)		
<b>13:30-14:30 Tumor &amp; Infection</b>		
<b>Moderator :</b> Hsien Te Chen (Taiwan), Jae Yoon Chung (Korea), Masatsune Yamagata (Japan), Tawechai Tejapongvorachai (Thailand)		
13:30-13:40	Early Intervention with Full-Endoscopic Debridement and Drainage(FEDD) Treating Various Spine Infection. A Current Trend of Spine Infection Treatment in Taiwan	Ching Hsiao Yu (Taiwan)
13:40-13:50	Hyperbaric Oxygen Therapy for Spinal Infections	Masatsune Yamagata (Japan)
13:50-14:00	Less Invasive Approach in Metastatic Spinal Tumor	Jin Sung Park (Korea)
14:00-14:10	When I Will Not Choose MIS Techniques for Metastatic Spinal Tumor ?	Naresh Kumar (Singapore)
14:10-14:20	MIS Spinal Cord Tumor Resection with VR/AR Technology	Fumitake Tezuka (Japan)
14:20-14:30	Discussion	



## Jul.14 (Fri) ▶ 1F Ball Room B

## Scientific Program

Time	Topic	Speaker
<b>14:30-15:30 Free Papers 2</b>		
<b>Moderator : Zairin Noor (Indonesia), Ting Kuo Chang (Taiwan)</b>		
15:20-15:30	Discussion	
<b>15:30-16:00 Coffee Break</b>		
<b>16:00-17:00 Degenerative Spinal Diseases</b>		
<b>Moderator : Komang Agung Irianto (Indonesia), Heui Jeon Park (Korea), Tsai Sheng Fu (Taiwan)</b>		
16:00-16:10	Positive Effects of Minimally Invasive Decompression Surgery for Lumbar Spinal Stenosis	Hidetomi Terai (Japan)
16:10-16:20	Strengths and Weaknesses of MIS-TLIF in Posterior Lumbar Fusion Surgery	Jae Hyup Lee (Korea)
16:20-16:30	MIS vs Open Posterior Spinal Fusion for Low Grade Spondylolisthesis	Shu Hua Yang (Taiwan)
16:30-16:40	Minimal Access Decompression Surgery in Lumbar Degenerative Disease	Motonobu Natsuyama (Japan)
16:40-16:50	Fusion Rate with Stand-Alone Mini-open Lateral-anterior Lumbar Interbody Fusion (LaLIF)	Zhaomin Zheng (China)
16:50-17:00	Discussion	
<b>17:00-18:00 Free Papers 4</b>		
<b>Moderator : Ki Tack Kim (Korea), Wen Hsiang Chou (Taiwan)</b>		
17:50-18:00	Discussion	



## Jul.14 (Fri) ▶ 1F Ball Room C

## Scientific Program

Time	Topic	Speaker
<b>14:30-15:30</b> <b>Free Papers 3</b>		
<b>Moderator :</b> Jae Hyup Lee (Korea), Ming Hsiao Hu (Taiwan)		
15:20-15:30	Discussion	
15:30-16:00	<i>Coffee Break</i>	
<b>16:00-17:00</b> <b>Cervical Spine</b>		
<b>Moderator :</b> Ming Chau Chang (Taiwan), Chi Chien Niu (Taiwan), Chung Hwan Kim (Korea)		
16:00-16:10	Surgical Treatment for Atypical Symptoms of Cervical Spine	Jui Teng Chien (Taiwan)
16:10-16:20	Sono-guided Intervention for Cervical Spine	Chien Hua Chen (Taiwan)
16:20-16:30	Cervical Arthroplasty in Multilevel Disc Diseases	Seok Woo Kim (Korea)
16:30-16:40	C3 and or C7 Dome Hybrid Open Door Laminoplasty	Gabriel Liu (Singapore)
16:40-16:50	Less Invasive Laminoplasty and its Application in Cervical Myelopathy	Wen Tien Wu (Taiwan)
16:50-17:00	Discussion	
<b>17:00-18:00</b> <b>Free Papers 5</b>		
<b>Moderator :</b> Hsien Te Chen (Taiwan), Dong Eun Shin (Korea)		
17:50-18:00	Discussion	

## Jul.15 (Sat) ▶ 1F Ball Room B

## Scientific Program

Time	Topic	Speaker
07:30-	Registration	
<b>08:00-08:36 Degenerative Spondylolisthesis</b>		
<b>Moderator :</b> Chien Min Lin (Taiwan), Chang Nam Kang (Korea), Jwo Luen Pao (Taiwan), Hidetomi Terai (Japan)		
08:00-08:10	I Prefer Endoscopic Decompression Alone for the Treatment of the 'Sable' Lumbar Degenerative Spondylolistheses	Jae Hung Shin (Korea)
08:10-08:20	Minimally Invasive Spine Surgery Using Multiple Screws in One Hole (MSIOH) Technique	Chang Jung Chiang (Taiwan)
08:20-08:30	Full-Endoscopic KLIF for Lumbar Spondylolisthesis and Local Scoliosis	Seiji Yamaya (Japan)
08:30-08:36	Discussion	
<b>08:36-09:24 Degenerative Scoliosis</b>		
<b>Moderator :</b> Yi Hung Huang (Taiwan), Seok Woo Kim (Korea), Koichi Sairyo (Japan), Gabriel Liu (Singapore)		
08:36-08:46	I Prefer Endoscopic Decompression Alone	Kuniyoshi Tsuchiya (Japan)
08:46-08:56	Interbody Fusion in Degenerative Lumbar Scoliosis Under Biportal Endoscopic Surgery	Seok Bong Jung (Korea)
08:56-09:06	I Prefer Biporal Endo-fusion	Chang Chen Yang (Taiwan)
09:06-09:16	I Don't Prefer Endoscopic Surgery	Shiau Tzu Tzeng (Taiwan)
09:16-09:24	Discussion	
10:00-10:30	<i>Coffee Break</i>	



## Jul.15 (Sat) ▶ 1F Ball Room C

## Scientific Program

Time	Topic	Speaker
07:30-	Registration	
<b>08:00-08:36 Concepts and Pitfalls for Endoscopic Spine Surgery-A</b>		
<b>Moderator : Zenya Ito (Japan), Shing Sheng Wu (Taiwan), Shrinivas Rohidas (India)</b>		
08:00-08:10	How to Perform Local Anesthesia for Endoscopic Spine Surgery	Kiyoshi Yagi (Japan)
08:10-08:20	How to Perform Transforaminal Full-Endoscopic Ventral Facetectomy under Local Anesthesia	Kazuya Kishima (Japan)
08:20-08:30	Concepts and Pitfalls of Endoscopic Lumbar Discectomy	Tawechai Tejapongvorachai (Thailand)
08:30-08:36	Discussion	
<b>08:36-09:24 Concepts and Pitfalls for Endoscopic Spine Surgery-B</b>		
<b>Moderator : Meng Huang Wu (Taiwan), Mathan Sakti Yudha (Indonesia), Warat Tassanawipas (Thailand)</b>		
08:36-08:46	Concepts and Pitfalls of Endoscopic Surgery For Lumbar Stenosis	Komang Agung Irianto (Indonesia)
08:46-08:56	Concepts and Pitfalls of Endoscopic Interbody Fusion	Hyeun Sung Harrison Kim (Korea)
08:56-09:06	Concepts and Pitfalls of Biportal Endoscopic Interbody Fusion	Zhi Kang Yao (Taiwan)
09:06-09:16	Complications of Spine Endoscopic Surgery	Cheng Li Lin (Taiwan)
09:16-09:24	Discussion	
09:24-10:00	TSESS Opening Remark	Yi Hung Huang (Taiwan) Chien Min Chen (Taiwan) Jwo Luen Pao (Taiwan) Keng Chang Liu (Taiwan) Chiung Chyi Shen (Taiwan)
10:00-10:30	<i>Coffee Break</i>	

## Jul.15 (Sat) ▶ 1F Ball Room B

## Scientific Program

Time	Topic	Speaker
<b>10:30-11:50 Free Papers 6</b>		
<b>Moderator :</b> Kuo Yuan Huang (Taiwan), Po Hsin Chou (Taiwan), Cheng Huan Peng (Taiwan), Tsung Ting Tsai (Taiwan)		
11:45-11:50	Discussion	
11:50-12:20	Luncheon Symposium (Baxter) Achieving Optimal Patient Positioning (Lateral-to-prone Technique) in Llif Surgeries	Jae Chul Lee (Korea)
12:20-13:00	PASMISS Closing	
<b>Moderator :</b> Keng Chang Liu (Taiwan), President 2023 Zhaomin Zheng (China), President 2024		
13:00-13:30	<i>Break</i>	
<b>13:30-14:30 Video Demonstration: How a Master Does</b>		
<b>Moderator :</b> Chien Min Chen (Taiwan), Kuo Pin Kuo (Taiwan), Ming Hsien Hu (Taiwan), Meng Ting Wu (Taiwan), Chien Chou Pan (Taiwan)		
13:30-13:42	Endoscopic Trans-Kambin Lumbar Interbody Fusion	Koichi Sairyo (Japan)
13:42-13:54	Advanced Techniques of Full Endoscopic Transforaminal Lumbar Interbody Fusion	Hyeun Sung Harrison Kim (Korea)
13:54-14:06	Biportal Endoscopic Transforaminal Lumbar Interbody Fusion Step-by-Step Video Demonstration	Jwo Luen Pao (Taiwan)
14:06-14:18	Navigation Guided Endo-TLIF in Degeneration Lumbar Lesion and: Tips and Tricks	Yi Hung Huang (Taiwan)
14:18-14:30	Complication Prevention and Management in Endoscopic Spine Surgery	Dong Hwa Heo (Korea)
<b>14:30-15:30 Video Contest</b>		
<b>Moderator :</b> Che Chia Hsu (Taiwan),		
<b>Discussant :</b> Koichi Sairyo (Japan), Hyeun Sung Harrison Kim (Korea), Heng Wei Liu (Taiwan), Chih Hui Chang (Taiwan), Nan Fu Chen (Taiwan), Kuo Tai Chen (Taiwan), Ting Chun Huang (Taiwan)		Yen Sheng Chiang (Taiwan) Shuo Chi Chien (Taiwan) Kai Ting Chien (Taiwan) Yuan Fu Liu (Taiwan) Yu Hung Chen (Taiwan)
<b>Evaluator :</b> All TSESS Board Member		
15:30-16:00	<i>Coffee Break</i>	
16:00-16:10	Video Contest Award	
16:10-16:30	TSESS Closing	
<b>Moderator :</b> Keng Chang Liu (Taiwan), Meng Ting Wu (Taiwan)		



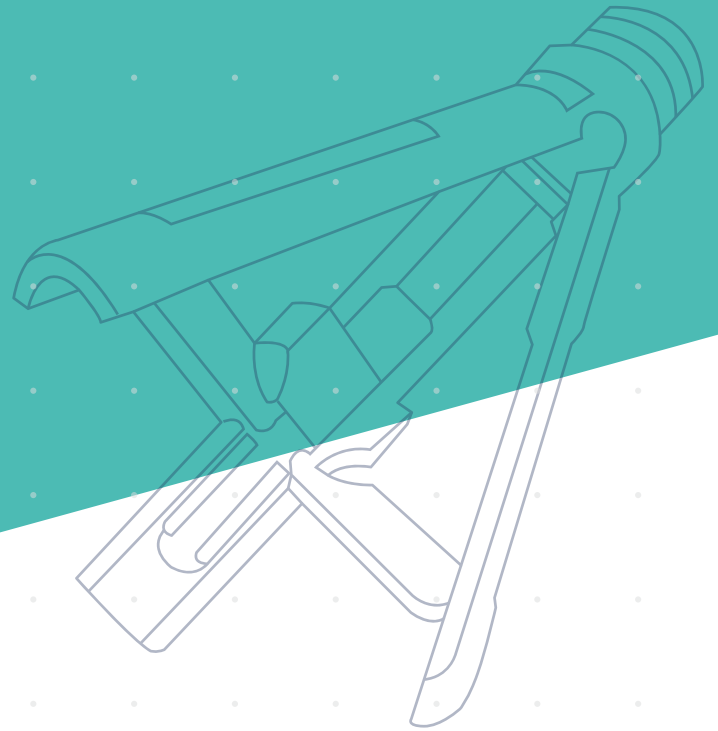
## Jul.15 (Sat) ▶ 1F Ball Room C

## Scientific Program

Time	Topic	Speaker
<b>10:30-11:30</b>	<b>Advancement of Endoscopic Surgery</b>	
<b>Moderator :</b> Wen Chien Chen (Taiwan), Hung Kang Wu (Taiwan), Chien Chun Chang (Taiwan), Se Yi Chen (Taiwan), Shang Wen Feng (Taiwan)		
10:30-10:40	Full Endoscopic Spine Surgery for Cervical Spondylotic Myelopathy: a systematic review	Chao Jui Chang (Taiwan)
10:40-10:50	Comparison of Unilateral Laminectomy for Bilateral Decompression by Four Surgical Methods	Zenya Ito (Japan)
10:50-11:00	Percutaneous Endoscopic Transforaminal Lumbar Interbody Fusion (PETLIF) for Lumbar Degenerative Disease	Koichiro Ono (Japan)
11:00-11:15	Endoscopic Treatment of Low Back Pain with Annular High Intensity Zone (HIZ) Lesion	Kazuta Yamashita (Japan)
11:15-11:25	Current Status of Endoscopic Surgery in Malaysia	Toh Charng Jeng (Malaysia)
11:25-11:35	Discussion	
11:50-12:20	Luncheon Symposium (Vantage & Spinendos) Current Techniques and Equipments of Full-Endoscopic Surgery - Go Back to Basics	Chien Min Chen (Taiwan)
<b>Moderator :</b> Hyeun Sung Harrison Kim (Korea), Dong Hwa Heo (Korea)		
13:00-13:30	<i>Break</i>	

# TRIPOD-FIX

## VERTEBRAL BODY AUGMENTATION SYSTEM



### TRIPOD-FIX Vertebral Body Augmentation System

Tripod-Fix Vertebral Body Augmentation System (Tripod-Fix) is designed for the treatment of vertebral compression fractures (VCFs), and it is intended to be used with polymethylmethacrylate (PMMA) bone cement for percutaneous vertebral augmentation.



### Feature

Before Expansion



After Expansion



Side View



Front View

### Benefit

- Three-dimension expansion mechanism provides the solid support of vertebral height restoration.
- Anatomical height restoration and controllable implant expansion of vertebral compression fracture (VCF), especially for wedge fracture.
- Retractable device specifically designed to provide more safety for patient in case the implant repositioning is required during the operation.





July 13 (Thu) - July 15 (Sat)  Tainan, Taiwan  
Formosa Hotel - International Banquet Hall.

1F Ball Room B

7/14 (Fri) 08:30-08:36

## Plenary Lecture: History and Current Status of Minimally Invasive Spine Surgery (MISS)

### Moderator



**Professor**

**Po Quang Chen** (Taiwan)

Professor emeritus, National Taiwan University, College of Medicine.

Director of PQ CHEN MD& ASSOCIATES President, Taiwan Spine Research Foundation

Honorary President, Pacific and Asian Society of Minimally Invasive Spine Surgery (PASMIS)



**Professor**

**Shin ichi Konno** (Japan)

Professor Emeritus Department of Orthopedic Surgery Fukushima Medical University School of Medicine

Executive Adviser The General Southern TOHOKU Research Institute for Neuroscience



**Professor**

**Jae Sung Ahn** (Korea)

Professor of Orthopaedic Surgery of Chungnam National University Hospital

General Secretary of PASMIS

Vice Dean of School of Medicine Chungnam National University



## Speaker



### Professor

## Ruey Mo Lin (Taiwan)

- ▶ Professor, China Medical University
- ▶ Honorary Superintendent of Tainan Municipal An-Nan Hospital
- ▶ Board member of the Pacific Asian Society of Minimally Invasive Spine Surgery
- ▶ Board member of Taiwan Spine Research Foundation

## History of Minimally Invasive Spine Surgery In Taiwan

Ruey-Mo Lin, MD, Professor

The concepts of minimally invasive spine surgery (MISS) are gradually growing since 50 years ago because the less postoperative pain and less tissue injuries are appealing to the patients and surgeons. About 30 years ago, the accumulation of surgical experiences and improved instrument design accelerate the popularity of MISS. In particular, the special drills, knives, pituitaries, Kerrison angulation punch help the endoscopic spine surgery.

In these 20 years, MISS flourish in Taiwan, catch up with the trend and even surpass the world level. What I will present were just some representative milestones because many developments occurred concurrently and independently.

The driving force of the development in Taiwan originated mainly from international academic communications in which PASMISS (The Pacific and Asian Society of the Minimally Invasive Spine Surgery) is most influential. The characteristic of this society is Asia-focused, stable personnel and continuing knowledge exchange. It does help promoting the trend. Other driving forces were scattered manufacturers importing (the related instruments) and individual coaching.

We have two domestic societies related to MISS. One is TSMISS (Taiwan Society of Minimally Invasive Spine Surgery) established in 2005, the other is TSESS (Taiwan



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Society of Endoscopic Spinal Surgery) established in 2018. We reached a consensus of taking turns as president by orthopedic and neurological spine surgeons.

Our domestic academic activities and training were thus rapidly growing in recent 10 years through different academic activities. Taiwan has a very distinctive Medical Simulation Center in Tzu-Chi University. They founded the Surgical Simulation Program in 2012 and held the cadaver workshop in different field, nearly every year or even seasonal. Regarding MISS, there were already more than 20 workshops and 300 learners. It did improve the skills, shorten the learning curves and decrease the complication.

Multichannel trainings are easily accessed in Taiwan; however, we still did not have an officially recognized qualification system. Only the certificate of completion or training certificate through different channels of training. The training and qualification is now under the surveillance of hospital-based senior doctors

Taiwan has a very good healthcare system which is a government-implemented social insurance scheme with a single-payer system and a global budget payment system. However, the system still has some pitfalls. The diagnostic and therapeutic coding for the newly developed surgeries cannot catch up with the reality. Therefore, we met the difficulties in the statistics of case numbers or complications about the new modalities. Soon, we might need a general survey through questionnaire or investigation by hospital. Furthermore, qualification system for endoscopic surgery is also discussed.

With newly designed surgical instruments, digital and images technologies and tissue modulation technologies (Laser or radiofrequency), the continuous rapid expansion of the indications for MISS will be expected.



Speaker



**Professor**  
**Koichi Sairyo** (Japan)

- ▶ Professor and Chairman, Department of Orthopedics, Tokushima University, Tokushima, Japan.
- ▶ Professor and Chairman, Tokushima University
- ▶ Pacific Asian Society for Minimally Invasive Spine Surgery: PASMISS Board member

## History of Minimally Invasive Spine Surgery In Japan

Koichi Sairyo, MD and PhD  
Professor and Chairman, Department of Orthopedics, Tokushima University  
Society Chairman, Japan Society of Minimally Invasive Spine Surgery

Around the late 1990's, endoscopic technologies for discectomy were started by Drs. Dezawa and Yamagata using their original system.

In 1998, Dr. Yoshida started MED surgery; then, endoscopic surgery became common in Japan. In 1999, our society was founded.

At the beginning, MED for discectomy and anterior lumbar fusion using retro-peritoneal scope was the main topics. MED technique is developed year by year in Japan. Finally, Japan established education system, and MED is still main minimally invasive endoscopic surgery in Japan.

In 2003, Dr. Dezawa started percutaneous endoscopic discectomy (currently, full-endoscopic spine surgery: FESS), and the technique is still developing. MIS fusion became possible due to percutaneous pedicle screw (PPS) system since 2006 in Japan. The application of XLIF and OLIF pushed further for the MIS development in the middle of 2010's. Moreover, robotic system and AR (augmented reality) system improve the accuracy of MIS. Thus, we can perform MIS decompression and MIS fusion, effectively and precisely. Finally, I would like to explain minimally invasive full-endoscopic trans-Kambin Fusion surgery at the end.



## Speaker



### Professor

## Seok Woo Kim (Korea)

- ▶ Professor of Department of Orthopaedic Surgery, School of Medicine, Hallym University
- ▶ President of ISASS AP (International Society for the Advancement of Spine Surgery)
- ▶ Associate Editor in "The Spine Journal", Official Journal of NASS (North American Spine Surgery),
- ▶ Deputy Editor in JASS (Journal of Advanced Spine Surgery)

## History of Minimally Invasive Spine Surgery In Korea

Seok Woo Kim, Past President of PASMISS 2020-2021

Minimally invasive surgery in Korea has undergone numerous developments since the establishment of the Korean Society of Minimally Invasive Surgery in 1986 as an affiliated society of the Korean Association of Spine Surgery.

It has the largest number of members among the societies under the Korean Society of Spine Surgery and continues to conduct active internal and external activities, forming a major pillar of the Korean Society of Spine Surgery. Initially, it was conducted by introducing various minimally invasive surgical methods throughout the spine and educating them, but gradually, it has been conducted in the direction of paralleling the purpose of education and practice by burying the cadaver workshop.

As minimally invasive surgery has become more common throughout the spine, each specialty has made advances. From simple disc surgery to deformity correction and tumor surgery using minimally invasive techniques, minimally invasive surgery has been developed in various areas. For last several years, the latest surgeries have been steadily carried out to young spine surgeons and domestic doctors by qualified lecturers and professors who had trained in various countries with their expertise in the field of minimally invasive spine surgeries, and quality education and practice that keeps pace with global trends have been repeated, and this has been the driving force behind the development of minimally invasive surgery in Korea today.



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Especially in recent years, the development of the endoscopy field has been prominent, and the activities at home and abroad have increased significantly, and it is showing remarkable growth among the fields due to the efforts of excellent lecturers and the response of members.

In particular, the fact that the level and ability of lecturers are maintained consistently by operating the lecturers centered on the society is the basis for evenly transferring the surgical ability in this field. As long as the society continues to strive to keep up with global trends in endoscopy and minimally invasive surgery in general, and as long as there is a smooth exchange between senior and junior members, it is expected to continue to play an important role in the development of spine in Korea, Asia, and the world.

Recently, we have been mobilizing various educational techniques centered on the field of endoscopy to communicate with our members. In particular, we have utilized our experience in conducting online education during the corona pandemic to communicate with members not only in Korea but also in other countries through YouTube and webinars. There are more opportunities to overcome regional limitations and share education and experience across countries. In addition, beyond the existing minimally invasive surgery field, we are paying attention to robotic surgery, navigation surgery, and surgical techniques using virtual reality or augmented reality, and are preparing for the upcoming minimally invasive surgery field.

I look forward to expanding into more diverse fields and providing opportunities to share education and experience with other countries around the world.

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## PASMISS Opening Remark & Congratulatory Messesges



**Professor**  
**Po Quang Chen** (Taiwan)  
Former President, Taiwan Spine Society  
Professor, PQ Chen MD & Associates



**Professor**  
**Chii Jeng Lin** (Taiwan)  
President, Joint Commission of Taiwan  
Professor, National Cheng Kung University Hospital Orthopedic Association



**Professor**  
**Cheng Hung Lee** (Taiwan)  
President, Taiwan Spine Society  
Deputy superintendent, Taichung Veterans General Hospital



**Professor**  
**Jwo Luen Pao** (Taiwan)  
Head, Depart. of Orthop. Surg., Far Eastern Memorial Hospital (FEMH), New Taipei, Taiwan  
Clinical Assistant Professor, Depart. Orthop. Surg, FEMH  
Chief, Division of Spine Surgery, Depart. of Orthop. Surg, FEMH



**Professor**  
**Jui Teng Chien** (Taiwan)  
Superintendent, Buddhist Douliou Tzu Chi Hospital



**Professor**  
**Keng Chang Liu** (Taiwan)  
Director, Division of Spine Surgery, Department of Orthopedics, Buddhist Dalin Tzu Chi Hospital, Taiwan  
President, PASMISS & TSESS, 2023

## Note

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## Computer-Aid Surgery / Navigation and Robotics

### Moderator



**Professor**

**Tsung Jen Huang** (Taiwan)

Professor Emeritus, Department of Medicine, College of Medicine, Taipei Medical University,  
Taiwan Professor, Department of Orthopedic Surgery, Taipei Medical University Hospital, Taiwan



**Professor**

**Jae Chul Lee** (Korea)

Soonchunhyang University Hospital, Seoul, Korea Professor  
PASMIS Board member  
Member of Cervical Spine Research Society Asia-Pacific



**Professor**

**Chung Chyi Shen** (Taiwan)

Chief of the Neurological Institute and Head of Department of Neurosurgery at TCVGH in Taichung, Taiwan.  
Member and President of Taiwan Society for Neurovascular and Interventional Surgery  
Member and President of Taiwan Pituitary Society



**Professor**

**Re Wen Wu** (Taiwan)

Chief, Department of Orthopaedic, Kaohsiung Chang Gung Memorial Hospital  
Associate professor, Kaohsiung Chang Gung Memorial Hospital  
Graduate Institute of Clinical Medical Sciences, Chang Gung University, Taiwan  
Attending Physician, Orthopedic Surgery, Chang Gung Memorial Hospital, Kaohsiung



Speaker



Professor

**Ming Chau Chang** (Taiwan)

- ▶ Department of Orthopedics, Taipei Veterans General Hospital  
Institute of Anatomy and Cell Biology
- ▶ National Yang Ming Chiao Tung University
- ▶ Chief, Department of Orthopedics Taipei Veterans General Hospital

## Experience in Computer-Navigation Assisted Lumbar Spine Surgery

Chang Ming-Chau Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital  
Institute of Anatomy and Cell Biology, School of Medicine,  
National Yang Ming Chiao Tung University, Taiwan

We have performed 985 cases of computer Navigation Assisted lumbar spine surgery in the past fifteen years. 910 cases of them were performed with 3-D navigation system; the other 75 cases were undergone with O-arm, intra-operative CT and ROSA navigation system. When performing the 3-D C arm guided lumbar surgery, skin attached reference frame were used instead of bony reference frame as the authorized dealer suggested.

We found that the accuracy of the pedicle screw position in both reference methods is no significant difference. The intra-operative CT guided surgery has best image quality, accuracy and wider scan field. However, the radiation exposure and set-up time is higher than 3-D CT especially when double check of the guide wire and pedicle screw position is necessary. Rosa system has higher set-up and learning curve, less operative field due to more complicate machine structure as well as higher cost. In conclusion, the main components of spine surgery are decompression, instrumentation, correction and fusion.

However, the modern electronic computer system can only help in instrumentation. Spine surgeons still need to complete the other steps with microscope or endoscope, which relies on free hands of surgeons. It is still a long way to complete a spine surgery with the assistance of modern systems.



Speaker



**Professor**  
**Yen Mou Lu** (Taiwan)

- ▶ Spine Surgeon, Orthopedics, Kaohsiung Medical University Hospital.
- ▶ Executive Director, Taiwan Society of Minimally Invasive Spine Surgery.
- ▶ President, The Pacific and Asian Society of Minimally Invasive Spine Surgery, PASMIS 2018

## Our Experience in Mazor Robot

Robotic spine surgery is popular nowadays. More stable robotic arm and more reachable trajectories improve the accuracy and applicability. By recognition of the invisible anatomic structures, it is particularly helpful in complex deformity, revision surgery and for percutaneous procedures. The extended applications including fracture, tumor and infection.

Minimally invasive spine surgery is hot today. The combination of robot and the minimally invasive surgery could be expected for reducing radiation exposures and improving accuracy and outcomes.

More than 1000 patients were operated using the Mazor Renaissance system at Kaohsiung Medical University Hospital since May 2013. Age from 10 to 89 years. The vertebral levels were from T2 to S1 including MIS and open surgeries. The accuracy was 98.4%. There were no serious major neurologic or vascular complications related to the use of robots.

Robotic guidance helps us to visualize the invisible. Robotic-assisted spine surgery has been widely used and reliable. Nevertheless, we still have to be careful when adopting this technology.



Speaker



**Professor Takanori Saito** (Japan)

- ▶ Vice-President of Kansai Medical University
- ▶ Director of Japanese Society for Spine Surgery
- ▶ Director of Japanese Society of Clinical Neurophysiology

## The Accuracy of PPS Insertion Under The Support of Spinal Robot: Does The Length of Experience of Spinal Surgery Have Any Influence on it?

Takanori Saito, Yoichi Tani, Masayuki Ishihara  
 Dept. of Orthopedic surgery Kansai Medical University Osaka Japan

### Introduction

Percutaneous pedicle screw (PPS) is such a low-invasive method that the clinical application is expanding from the single vertebral fixation on lumbar spine degenerative diseases to metastatic spinal tumors, pyogenic spondylitis, trauma and adult spinal deformity. One of the disadvantages of the spinal fixation using PPS is an X-ray exposure to the surgical team members because this method is usually performed under X-ray fluoroscopy. To overcome the disadvantage, we developed an original device to insert PPS free hand without X-ray fluoroscopy, that is, the combination of LICAP and screw electronic stimulation methods, which secured the accuracy and safety. However, since this method requires the technique to insert PPS free hand using open method, it takes a lot of time and experience to master it. Thus, we cannot deny that this is an inappropriate method especially to young spinal surgeons. We have installed the operation support robot since June 2022 and started PPS insertion under the support of the robot. In this study we investigated the accuracy and whether the length of experience of spinal surgery has any influence on it.



## Materials and methods

We examined 37 patients (21 males and 16 females, average age 72.2 years) who underwent PPS insertion under the support of Cirq robot arm system (Brain Lab). The spinal robot carried out PPS insertion according to the navigation system which was constructed based on the CT images taken during the operation. The breach rate during PPS was evaluated using CT-based Gertzbein and Robbins classification from grade A to E.

## Results

Grade C, D, and E breach during PPS was observed in 14 of 290 screws, resulting in the accuracy of 95.2%. The accuracy of PPS insertion was 95.7% by the spinal surgery consultant doctors, 93.7% by the orthopedic surgery specialists, and 97.2% by the residents of the orthopedic surgery. There was no significant difference among the orthopedic surgeons irrespective of the length of experience in orthopedic surgery. Grade D breach was caused by skiving which was characteristic in robot operation.

## Discussion

The PPS insertion under the support of spinal robot not only minimizes X-ray exposure to the surgical team members but also becomes a useful tool with a high accuracy irrespective of the length of experience in spinal surgery.



Speaker



**Professor**

**Jacob Yoong Leong Oh** (Singapore)

- ▶ Senior Consultant  
Department of Orthopaedics, Tan Tock Seng Hospital
- ▶ Director of Spine Services  
Department of Orthopaedics, Tan Tock Seng Hospital.
- ▶ Deputy Head  
Department of Orthopaedics, Tan Tock Seng Hospital
- ▶ Board Member  
Society for Minimally Invasive Spine Surgery (SMISS AP)
- ▶ Board Member  
Pacific and Asian Society for MIS Surgery (PASMISS)

## Getting Started With the Mazor X and How it Changed My Practice

In recent years, there has been a revival of robotic technology in Spinal Surgery. In this talk, we will explore the early experience with the Mazor X robot and what advantages it may bring for MIS lumbar fusion surgery.



Speaker



**Professor**  
**John Choi** (Australia)

- ▶ Director of Orthopaedic Spine Surgeon Spine Ortho Clinic, Melbourne, Australia
- ▶ Society of Minimally Invasive Spine Surgeons (SMISS) – Director
- ▶ Australian Institute of Musculoskeletal Science (AIMS) – Fellowship Director
- ▶ Society of Lateral Access Surgery (SOLAS) – Community Chair

## Lessons from 300 Robotic Spinal Surgeries using Globus' ExcelsiusGPS System

Author: John Choi, Orthopaedic Spine Surgeon Melbourne, Australia

Single position lateral surgeries have become popular among the lateral surgeons owing to largely significant time savings over the conventional two position approach when performing 360-degree thoracolumbar fusions. Conventionally, the instrumentation was performed in prone position with the aid of fluoroscopy or navigation with intraoperative CT or sometimes, free hand technique with open approach. These techniques have been previously validated and reported accuracy of 90 to 97% with radiation exposure to operating personnel during the procedure. Since the adoption of the 3<sup>rd</sup> generation spine robotic system, Globus Excelsius GPS system in March 2019, our clinic has performed over 300 cases of spine instrumentation including single position lateral surgeries. As with any new techniques there are learning curve, workflow requirements, adoption hurdles and challenges; robot assisted surgeries are not exception and requires meticulous planning and patience to successfully implement the approach. Robot assisted surgeries can provide efficiency, time savings, improved accuracy and reduced radiation exposure to staff and excellent outcomes in fusion surgeries. The future of robot assisted spine surgery is promising and future applications are encouraging.



# NAV ENTO

## Navigation Endoscopic Tower

### 4<sup>TH</sup> GENERATION TOWER

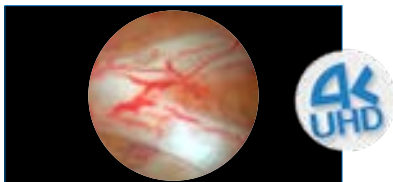
The 4<sup>th</sup> generation units have a standardized design and are equipped with a touch panel (the Versicon® irrigation pump follows). The front has been designed using ceranglass, which ensures easy cleaning.

#### 1 Vitegra® Visual Integration System

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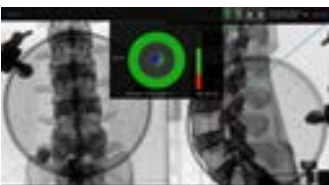
#### 2 Camsource® LED Camera & Light Source System



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## Osteoporotic Vertebral Compression Fractures

7/14 (Fri) 10:30-11:30

### Moderator



**Professor**

**Hiroshi Yamada** (Japan)

Professor and chairman of Department of Orthopaedic Surgery, Wakayama Medical University, Wakayama



**Professor**

**Shih Chieh Yang** (Taiwan)

Vice superintendent of E-Da Cancer Hospital  
Chief of Orthopaedic Department E-Da Hospital



**Professor**

**Luthfi Gatam** (Indonesia)

Director of Orthopedic and Traumatology Department at Fatmawati Hospital since 2009.  
Lecturer in Spinal Orthopedics at the Faculty of Orthopedic Specialists, University of Indonesia.  
Chairman of Gatam Institute (Eka Hospital Orthopedic & Spine Center) since 2021.



Speaker



**Professor**  
**Chung Hwan Kim** (Korea)

- ▶ Professor of Department of Orthopaedic Surgery, Gangneung Asan Hospital
- ▶ University of Ulsan Medical College

## I Prefer Vertebroplasty over Kyphoplasty

Chunghwan Kim, MD  
Department of Orthopaedic Surgery, spine Center, Gangneung Asan Hospital,  
University of Ulsan Medical College, Republic of Korea

I have summarized several methods to minimize complications and achieve good treatment effects in percutaneous vertebroplasty. Increased intravertebral instability due to osteoporotic fractures or other pathological conditions can result in pain, deformity, or reduced function. In this case, percutaneous vertebroplasty is a useful treatment method to reduce pain and restore function by injecting bone cement into the vertebral body to increase vertebral stability. However, in percutaneous vertebroplasty, complications such as bone cement leakage, bone cement mass displacement, posterior displacement of vertebral fragments, intravertebral refracture, adjacent vertebra fracture, radiation exposure and overuse may occur. If these complications can be prevented, vertebroplasty can bring better treatment effects than balloon vertebroplasty.

### 1. Prevent cement leakage

In order to prevent bone cement leakage in percutaneous vertebroplasty, it is necessary to inject high-viscosity bone cement easily with little force. Bone cement leakage can be prevented if percutaneous vertebroplasty is performed considering the proper injection start time and bone cement viscosity while understanding the mechanism of fluid mechanics well and using an appropriate injector.

### 2. Prevention of bone cement dislocation

In order to prevent bone cement dislocation, it is preferable to allow bone cement



to permeate into the remaining bone tissue of the vertebral body rather than being injected as a smooth round mass, isolated from intact bone structure.

### 3. Prevention of posterior displacement of vertebral fragments

In order to prevent posterior bone fragments from additional dislocating posteriorly into spinal canal, it is desirable to sufficiently fill the space between the upper and lower epiphyseal plates to prevent additional vertebral compression.

### 4. Prevent re-fracture

Re-fractures occur, because stability within the vertebral body was not sufficiently secured during the first percutaneous vertebroplasty. To prevent this re-fracture, it is necessary to inject bone cement into the entire vertebral body, as if a pillar was erected between the upper and lower epiphyseal plates of the vertebral body.

### 5. Adjacent vertebral fracture problems

It is desirable not to recover excessive vertebral body height. Be careful not to leak bone cement into the intervertebral disc and the anterior upper part of the vertebral body.

### 6. Expansion of indications for percutaneous vertebroplasty

Percutaneous vertebroplasty can be a useful palliative treatment for spinal tumors without neurologic symptoms. When performing spinal fixation surgery, percutaneous vertebroplasty can be optionally performed in order to strengthen the fixation force and to reinforce the fractured vertebrae.

### 7. Summary

Percutaneous vertebroplasty may have complications such as bone cement leakage and displacement, posterior displacement of vertebral fragments, re-fracture or adjacent vertebra fracture after percutaneous vertebroplasty, and radiation exposure. But understanding the hydrodynamic characteristics and principles of bone cement injection, and paying enough attending to prevent the complications, it can be a good choice for treating vertebral instability and pain caused by osteoporotic compression fractures, osteonecrosis after fractures and tumors as an alternative to balloon kyphoplasty



Speaker



Professor

**Shih Hsiang Chou** (Taiwan)

- ▶ Orthopaedic Staff-Kaohsiung Medical University Hospital
- ▶ Orthopaedic Department, National Tokushima University Hospital, Japan (Prof. Sairyō),

## I Prefer Kyphoplasty

Unstable vertebral fragility fractures of the thoracolumbar spine may or may not be associated with associated trauma. Osteoporotic compression fractures often develop neurological deficits and severe pain, which causing disability in elderly patients. The goal of treatment is to ensure rapid mobility and maintain spinal alignment.

Segment pedicle screw internal fixation with vertebroplasty in index fractured vertebrae is a valuable surgical option for the treatment of elderly patients with thoracolumbar fractures. The advantages include greater strength of the fractured vertebral body, effective maintenance of kyphotic angle correction, rapid relief of low back pain, and promotion of early rehabilitation and mobility.

Speaker



Professor

**Warat Tassanawipas** (Thailand)

- ▶ Phramongkutklo Army Hospital Department of Orthopaedics
- ▶ PASMISS Board Member

## I Prefer Fusion Surgery

Most OVCF can be treated successfully with conservative treatment included, analgesia, brace, physical therapy, osteoporosis medications and prevention of new OVCF and falling. The surgical intervention is recommended when the conservative treatment is failed during the first 8-12 weeks especially unable mobilization and impairment of ADL by pain.

Surgery for OVCF included percutaneous cement augmentation intervention such as Percutaneous vertebroplasty, Percutaneous Kyphoplasty and Titanium implant vertebral augmentation devices. The aims is to manipulate the vertebral body and restoration of the vertebral height.

OVCF may be treated will posterior stabilization alone with the concept of indirect reduction techniques by ligamentotaxis. The lack of anterior column support may lead to further collapse of the index vertebrae.

The cement augmentation to reconstruction of anterior column in conjunction with posterior stabilization either short or long fusion technique is greatly expanded and be the current used in OVCF surgery.



Speaker



**Professor**  
**Meng Huang Wu** (Taiwan)

- ▶ Taiwan Society of Minimally Invasive Spine Surgery, Board Director
- ▶ Taiwan Medical Design Association, Board Director, Vice Director, International Affairs and Academic Committee
- ▶ Taiwan Society of Endoscopic Spine Surgery, Executive Board Director

## The Role of Spine Endoscopic Surgery in Osteoporotic Vertebral Compression Fractures

### Introduction:

Osteoporotic vertebral compression fractures (OVCFs) are a significant cause of kyphosis and radicular pain due to foraminal stenosis. Cement augmentation such as vertebroplasty, kyphoplasty and intravertebral stenting have demonstrated effectiveness in providing pain relief and restoring vertebral height. However, these procedures carry risks of complications, including cement leakage causing foraminal stenosis. This abstract explores the emerging role of spine endoscopic surgery in the foraminal stenosis caused by OVCFs or cement leakage during vertebroplasty.

### Methods:

A thorough review of the literature was conducted using electronic databases, including PubMed and Google Scholar. Articles published between 2010 and 2023 were identified and critically analyzed. Search terms included "osteoporotic vertebral compression fractures," "spine endoscopic surgery," "minimally invasive spine surgery," "foraminal stenosis," "vertebroplasty," "kyphoplasty," "intravertebral stenting," and "cement leakage."

### Results:

Spine endoscopic surgery has shown promising results in preventing complications associated with OVCFs and related treatments, specifically foraminal stenosis and





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cement leakage. The endoscopic visualization allows for direct assessment and decompression of the neural foramina. The minimally invasive nature of spine endoscopic surgery contributes to reduced tissue trauma, quicker recovery times, and improved patient outcomes.

#### Conclusion:

The role of spine endoscopic surgery in preventing complications, such as foraminal stenosis and cement leakage, is gaining recognition in the management of osteoporotic vertebral compression fractures. The utilization of endoscopic guidance enables precise decompression of the neural structures, reducing the risk of adverse events and optimizing patient outcomes. Further research is necessary to validate the long-term benefits and refine surgical techniques associated with spine endoscopic surgery in preventing complications related to OVCF treatments.



## Speaker



### Professor

## Yen Jen Chen (Taiwan)

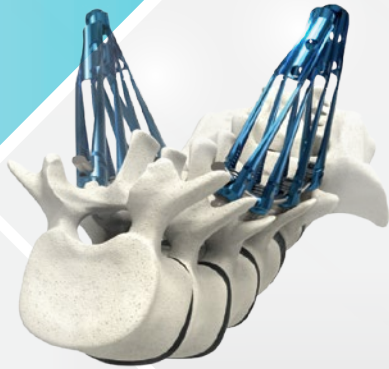
- ▶ Supervisor of Taiwan Spine Society
- ▶ Professor of China Medical University
- ▶ Board member of The Spine Journal
- ▶ PASMISS Board member

## Diagnosis and Treatment of Painful Cemented Vertebrae

Yen-Jen Chen, MD  
 Department of Orthopedic Surgery, Asia University Hospital  
 School of Medicine, China Medical University, Taichung, Taiwan

MRI was the gold standard in diagnosis of vertebral compression fractures (VCFs). However, the diagnosis of painful cemented vertebrae was not clearly defined. Radiographs, MRI and bone scan were used for diagnosis. Bone edema and fluid may be persisted in the painless cemented vertebrae in MRI. Increased uptake may be persisted for 1-2 years after fracture in bone scan. These will make the diagnosis of painful cemented vertebrae difficult. Modified dynamic radiographs (one sitting and one supine cross-table with or without bolster lateral radiographs) were proved to be useful in diagnosis of painful VCFs. When applying to painful cemented vertebrae, modified dynamic radiographs were also proved to have high sensitivity in the diagnosis.

There were many surgical methods to treat painful cemented vertebrae, including repeat vertebroplasty (PVP), anterior surgery, posterior surgery, and combined anterior and posterior surgery. Till now, there is no any consensus about how to choose the revision surgery to treat painful cemented vertebrae. According to previous data, the surgical decision depends on endplate integrity, presence of vacuum or not, dura compression or not, and presence of neurological symptoms. Modified dynamic radiographs were very important in the diagnosis of endplate integrity. According to these 4 factors, a protocol for surgical decision for failed vertebroplasty (painful cemented vertebrae) can be established. And the following surgeries were re-PVP, re-PVP with posterior fusion, re-PVP with laminectomy and posterior instrumentation, posterior combined anterior surgery with or without laminectomy.



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A collection of three interlocking Ti-PEEK cages in yellow, blue, and tan. A circular inset shows a magnified view of the porous, textured surface of the cages.

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## Best Paper Competition

### Moderator



**Professor**

**Hyoung Yeon Seo** (Korea)

Professor, Department of Orthopedic Surgery,  
Chonnam National University Medical School



**Professor**

**Hiroshi Yamada** (Japan)

Professor and chairman of Department of Orthopaedic  
Surgery, Wakayama Medical University, Wakayama



**Professor**

**Naresh Kumar** (Singapore)

Senior Consultant, University Spine Centre, Department of  
Orthopaedic Surgery, National University Hospital  
MBBS (AIIMS); MS Orth. (AIIMS); DNB Orth.; FRCS Ed.; FRCS  
(Orth & Trauma); DM (Orth Spinal Surgery)  
(Univ. of Nottingham)



**Professor**

**Ruey Mo Lin** (Taiwan)

Professor, China Medical University  
Honorary Superintendent of Tainan Municipal An-Nan Hospital  
Board member of PASMISS  
Board member of Taiwan Spine Research Foundation



**Professor**

**Shrinivas Rohidas** (India)

M. S., M. Ch. Neurosurgery  
Consultant, Neuro-Spinal Endoscopic Surgery P.D. Hinduja  
Hospital



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7/14 (Fri) 11:30-12:30

## Speaker

B1 **Yu Hao Huang**  
(Taiwan) Comparison of MIS-TLIF Versus BETLIF in Lumbar Degenerative Disc Disease: Clinical and Radiologic Outcomes

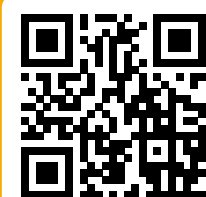
B2 **Sub Ri Park**  
(Korea) Effectiveness of the Two-way BESS Decompression in Central to Extraforaminal Stenosis Patients with Facet Joint Preservation: Minimum 1-year Short-term Follow-up

B3 **Yu Chia Hsu**  
(Taiwan) Investigating the Interplay of Aging and Hypoxia in Sprouting Angiogenesis of Ligamentum Flavum Hypertrophy

B4 **Hiromitsu Toyoda**  
(Japan) Incidence of Postoperative Progressive Segment Degeneration at Decompression and Adjacent Segments after Minimally Invasive Lumbar Decompression Surgery: A 5-year Follow-up Study.

B5 **Yudha Mathan Sakti**  
(Indonesia) Scoring System of Predictive Factors for Non-favorable Outcome in Transforaminal Percutaneous Endoscopic Lumbar Discectomy (TPELD)

B6 **Masayoshi Iwamae**  
(Japan) Fat Infiltration of Cervical Multifidus Muscles Negatively Affects Physical Related Quality-of-Life After Laminoplasty for Degenerative Cervical Myelopathy



SCAN ME



## Free Papers 1

### Moderator



SCAN ME



**Professor**

**Yen Mou Lu** (Taiwan)

Spine Surgeon, Orthopedics, Kaohsiung Medical University Hospital.

Executive Director, Taiwan Society of Minimally Invasive Spine Surgery.

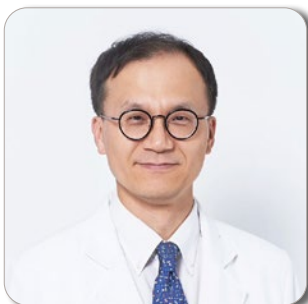
President, The Pacific and Asian Society of Minimally Invasive Spine Surgery, PASMISS 2018



**Professor**

**Yutaka Hiraizumi** (Japan)

Professor, Department of Orthopaedic Surgery, Showa University, Tokyo, Japan



**Professor**

**Yung Park** (Korea)

Clinical Professor, Department of Orthopedic Surgery, Yonsei University, College of Medicine, Seoul, South Korea.

Attending Physician, Spine Service, Department of Orthopedic Surgery, National Health Insurance Service Ilsan Hospital, Goyang, South Korea.



**Speaker**

F1-1	<b>Yuan Fu Liu</b> (Taiwan)	Comparison of the Efficacy of Single Vertebral Augmentation Device SpineJack® and Double Devices for Treatment of Single-level Vertebral Compression Fractures.
F1-2	<b>Meng Huang Wu</b> (Taiwan)	The Treatment of Vertebral Compression Fractures with a Novel Intravertebral Expandable Implants - A Retrospective Case Series Study
F1-3	<b>Takayuki Ogawa</b> (Japan)	Clinical and Radiological Outcome of Balloon Kyphoplasty and Short Segment Posterior Fusion with Percutaneous Pedicle Screw Augmented with Hydroxyapatite in Traumatic Thoracolumbar Fracture involving Three Spinal Columns in Elderly Patient with Diffuse Idiopathic Skeletal Hyperostosis
F1-4	<b>Zairin Noor</b> (Indonesia)	Effect of Bisphosphonates on Quality of Life in Osteoporosis Patient : A Meta-Analysis Study
F1-5	<b>Yao Ju Liu</b> (Taiwan)	Outcome Analysis of Robotic System Assisted Percutaneous Pedicle Screw Fixation for 1-level Minimally Invasive Transforaminal Lumbar Interbody Fusion
F1-6	<b>Jacob Oh</b> (Singapore)	Single Position Minimally Invasive Corpectomy with Robotic Assisted Instrumentation: Technique Review and Early Lessons Learnt
F1-7	<b>Jie Wei Chang</b> (Taiwan)	Efficacy and Safety of the Additive Manufactured Porous Interbody Cage in Lumbar Spinal Fusion Surgery : Case Series and Literature Review
F1-8	<b>Yu Meng Hsiao</b> (Taiwan)	A Rare Complication of Flexible Inversion, Cavus Foot with Claw Toes by Mini-open Decompression - Solution and Full Studies by 3D Reconstruction and Serial Videos
F1-9	<b>Yu Ching Hsiao</b> (Taiwan)	Pre and Post Pedicle Screw Trajectory Assessment for Spine Surgery
F1-10	<b>Hee Jung Son</b> (Korea)	Acute Phase Side Effects of Escherichia coli-derived Bone Morphogenetic Protein-2 in Lumbar Fusion Surgery
F1-11	<b>Keisuke Nishidono</b> (Japan)	Outcomes of Posterior Cervical Fusion Using The O-Arm Based Navigation System -Precision of Cervical Pedicle Screw, Lateral Mass Screw, And Laminar Screw-

1F Ball Room B

7/14 (Fri) 12:30-13:00

**Luncheon Symposium (Globus/Prospine)**  
**Innovation in Spine Surgery**

Video

**Note**

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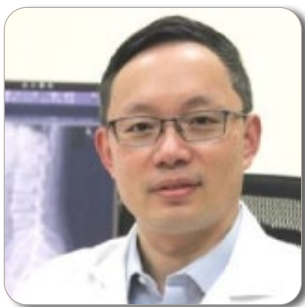
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## Luncheon Symposium (Baxter) Haemostasis in Endoscopic Spine Surgery

### Moderator



**Professor**  
**Cheng Li Lin** (Taiwan)

- ▶ Director of Spine division Department of Orthopedic Surgery National Cheng Kung University Hospital, Tainan, Taiwan
- ▶ Secretary General Taiwan Society of Endoscopic Spine Surgery 2023
- ▶ Secretary General Pacific and Asian Society of Minimally Invasive Spine Surgery 2023

### Speaker



**Professor**  
**John Choi** (Australia)

- ▶ Director of Orthopaedic Spine Surgeon Spine Ortho Clinic, Melbourne, Australia
- ▶ Society of Minimally Invasive Spine Surgeons (SMISS) – Director
- ▶ Australian Institute of Musculoskeletal Science (AIMS) – Fellowship Director
- ▶ Society of Lateral Access Surgery (SOLAS) – Community Chair

## Luncheon Symposium (Globus/Prospine) Expandable Interbody Spacers in MIS Spine Surgery

### Moderator



**Professor**

**Tsai Sheng Fu** (Taiwan)

- ▶ Chairman of Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Linkou.
- ▶ Professor of Chang Gung University & National Tsing Hua University, College of Medicine.
- ▶ President of Taiwan Bone Muscle Joint Total Care Association (TBMJ).

### Speaker



**Professor**

**John Choi** (Australia)

- ▶ Director of Orthopaedic Spine Surgeon Spine Ortho Clinic, Melbourne, Australia
- ▶ Society of Minimally Invasive Spine Surgeons (SMISS)  
– Director
- ▶ Australian Institute of Musculoskeletal Science (AIMS)  
– Fellowship Director
- ▶ Society of Lateral Access Surgery (SOLAS)  
– Community Chair



July 13 (Thu) - July 15 (Sat)  Tainan, Taiwan  
Formosa Hotel - International Banquet Hall.

1F Ball Room C

7/14 (Fri) 13:00-13:30

## Luncheon Symposium (Synthes/J&J DePuy Synthes) ALIF-Lordosis Matters: Why and How We Choose

### Moderator



**Professor**

**Cheng Hung Lee** (Taiwan)

- ▶ Deputy superintendent of Taichung Veterans General Hospital Taiwan
- ▶ President of Taiwan Spine Society
- ▶ President of Taiwan Society of Minimal Invasive Spine Surgery
- ▶ Executive Director of Taiwan Orthopedic Association

### Speaker



**Professor**

**Kun Hui Chen** (Taiwan)

- ▶ Staff of Spinal Surgery Section, Orthopaedics Department, VGH-TC
- ▶ Chief of Bone Disease Section, Orthopaedics Department, VGH-TC



## Adult Spinal Deformity (ASD)

7/14 (Fri) 13:30-14:30

### Moderator



**Professor**

**Kazuo Nakanishi** (Japan)

Professor, Department of Physical Therapy, Kawasaki University of Health and Welfare, Department of Rehabilitation Science



**Professor**

**Jae Sung Ahn** (Korea)

Professor of Orthopaedic Surgery of Chungnam National University Hospital  
Vice Dean of School of Medicine Chungnam National University



**Professor**

**Hee Kit Wong** (Singapore)

MBBS (S'pore), MMED (Surg), FRCS (Glas), MCh (Orth) Liv., FAMS  
Professor of Orthopaedic Surgery, National University of Singapore (NUS)  
Emeritus Consultant, University Spine Centre, National University Hospital (NUH)



**Professor**

**Wun Jer Shen** (Taiwan)

Board of Directors, Taiwan Spine Society  
Hospital for Special Surgery International Ambassador in Taiwan  
Director, Po-Cheng Orthopedic Institute, Kaohsiung, Taiwan  
Director Emeritus, Park One International Hospital, Kaohsiung, Taiwan

Speaker



Professor

**Cheng Hung Lee** (Taiwan)

- ▶ Deputy superintendent of Taichung Veterans General Hospital Taiwan
- ▶ President of Taiwan spine society
- ▶ President of Taiwan society of minimal invasive spine surgery
- ▶ Executive Director of Taiwan Orthopedic Association

## Updates on Miss Techniques for Adult Spinal Deformity(ASD) Correction

Due to the relatively high morbidity associated with traditional open posterior corrective surgery for adult spinal deformity (ASD), minimally invasive spine surgery (MISS) techniques including MISS anterior, oblique or lateral lumbar interbody fusion and posterior MIS instrumentation, have garnered increased attention as alternative and/or adjunct modalities with a goal of reduced surgical access morbidity and fewer perioperative complications. Especially in increasingly frail patients who may not be candidates for surgery using traditional open techniques, surgery performed with a MIS technique may offer acceptable outcomes and correction rate. In this section, we reviewed the current updated evidence among MISS technique in adult spinal deformity correction.



Speaker



**Professor**  
**Jae Chul Lee** (Korea)

- ▶ Soonchunhyang University Hospital, Seoul, Korea Professor
- ▶ Seoul National University Hospital  
Seoul, Korea
- ▶ Residency - Orthopaedic Surgery  
Seoul National University Hospital  
Seoul, Korea

## Complication Management and Prevention in Minimally Invasive Lateral Fusion Surgery for Adult Spinal Deformity

Department of Orthopedic Surgery, Soonchunhyang University Seoul Hospital, Seoul, Korea  
Jae Chul Lee, MD

Spinal fusion surgery has been utilized for the treatment of various spinal pathologies for nearly a century. Traditional approaches, such as posterolateral fusion, posterior or anterior interbody fusion, often required extensive dissection to expose the targeted fusion area. However, recent technological advancements have led to the development and clinical application of minimally invasive techniques for spinal fusion. Lateral lumbar interbody fusion (LLIF) is a minimally invasive surgical approach that utilizes tubular retractors or long blades to access the retroperitoneal space, passing through or anterior to the psoas muscle to perform anterior interbody fusion. Compared to posterior approaches, LLIF allows for the use of larger interbody cages, effectively increasing disc height and indirectly decompressing neural structures. Additionally, it offers enhanced stability and fusion efficacy, and it can effectively correct the balance between the sagittal and coronal planes in degenerative lumbar conditions.

However, complications associated with lateral access fusion surgery can arise from surgical approach-related factors and fixation instrumentation. Approach-related complications include anterior thigh pain, diminished hip flexion strength, nerve root injury, vascular injury, intestinal injury, and ureter injury. Fixation-related complications primarily involve cage subsidence and migration.

Anterior thigh pain and diminished hip flexion strength are mainly attributed to the splitting or retraction of the psoas muscle. Mild nerve root injuries resulting from traction or manipulation during surgery have also been reported. The incidence of these complications, including mild cases, can reach up to 75% immediately after



surgery, but it rapidly decreases over time, with less than 1% of patients experiencing symptoms persisting up to one year postoperatively. To overcome these challenges, oblique lateral antepsoas interbody fusion techniques have been developed, allowing for a lateral approach without psoas muscle splitting. This approach also provides an additional advantage of accessing the L5-S1 level, which is not feasible with direct lateral fusion.

Nerve root injuries are often related to the distribution of the nerve roots in the posterior half of the lateral aspect of L4-L5 disc level. To prevent such injuries, it is recommended to utilize the anterior one-third of the disc space for surgery, although the author's personal experience suggests that using the central portion with splitting the muscles and neuromonitoring has not resulted in nerve root injuries. Neurapraxia can occur when the surgical table is excessively bent for a prolonged period, thus starting with the L4-L5 level, then adjusting the table to flat, and proceeding with the L3-L4 and L2-L3 levels can be a beneficial technique. Visual confirmation of the absence of nerves and the effective utilization of nerve monitoring devices are also important in preventing nerve root injuries. The author has performed lateral fusion surgeries for over 10 years using these techniques without experiencing nerve root injuries.

Vascular injury is a rare but critical complication that requires careful attention. While it is almost absent in direct lateral fusion surgery, lateral antepsoas OLIF approaches pose a relatively higher risk due to the proximity to major blood vessels. Intraoperative caution should also be exercised to prevent intestinal and ureteral injuries. If ureteral injury is detected, it can be managed using ureteral stenting. Incisional herniation can be minimized by making multiple small incisions instead of a single large incision, even for multiple levels, can help prevent it.

Cage subsidence is a significant complication in lateral access fusion surgery as it can compromise stability, reduce lordotic correction, and lead to recurrent pain and neurological symptoms. During surgery, preserving the endplates and removing only the cartilaginous endplates with meticulous care is crucial, and the use of excessively large cages should be avoided.

By thoroughly understanding the potential complications associated with minimally invasive lateral and transpsoas fusion surgery and employing appropriate surgical techniques to prevent them, it is possible to overcome the limitations of traditional fusion methods used in the treatment of degenerative lumbar deformities. This approach is able to minimize soft tissue damage, reduces blood loss, facilitates faster postoperative recovery, and ultimately increases patient satisfaction.



## Speaker



**Professor**  
**Tzai Chiu Yu** (Taiwan)

- ▶ Director, R and D Center of Joint Reconstruction, Tzu-chi Medical center
- ▶ Visiting Professor, Department of Joint Surgery, Jiao-Toung University, XiAN
- ▶ Councilman of Orthopedic Association
- ▶ Editor Board Member, Journal of Orthopedic Surgery. COA
- ▶ Councilman of The National Science and Technology Program for Biotechnology, National Science Council

## I Choose Anterior Approach For Adult Spinal Deformity

Tzai-Chiu Yu MD.  
 Tzu Chi Medical Center ,Hualien ,Taiwan

Minimally invasive surgery (MIS) techniques used for management of adult spinal deformity (ASD) aim to decrease the physiological demand on patients and minimize postoperative complications. Anterior lumbar interbody fusion (ALIF) initially introduced in the 1930's, has become a common and widely accepted technique for spinal fusions over the decades due to it offering several advantages over standard posterolateral fusion posterior lumbar interbody fusion (PLIF) or transforaminal lumbar interbody fusion (TLIF) in terms of more lordosis and increase fusion rate of spine. Since 1997 minimally invasive anterior approach was started by Mayer and more recently, the ant. oblique approach ,lateral trans-psoas approach direct or lateral lumbar interbody fusion (OLIF,XLIF, DLIF, LLIF) is gaining widespread popularity due to its minimal invasiveness. The indications may include: discogenic low back pain, , radiculopathy due to foraminal stenosis, lumbar degenerative spinal deformity including symptomatic spondylolisthesis and degenerative scoliosis. From the view point of pathomechanics , unlike the second scoliosis, most of ASD are initiated by disc pathology, the disc is the main generator of deformity ,asymmetric disc collapse ,conjunction with more anterior placed spine load make the deformity progress on both coronal and sagittal plane. So, if you want correct the deformity, the main power of correcting force should be applied from anteriorly , correct deformity by use of by release of annulus (ligamentotaxis)





and correction of kyphosis by release of anterior longitudinal ligament (piecrust or transection).

Advantages of ALIF is also signified by it provide larger area of fusion bed, increase the fit and fill of interface ,regardless of which material we use, it increases the fusion rate. We all known that "fusion is not everything ,but pseudoarthrosis is nothing". ALIF provide indirect decompression of the neural elements , make posterior decompression surgery avoidable , combined with posterior MIS instrumentation offers the potential to maximize this MIS advantage over standard posterior approaches, fusion of the thoracic levels could achieve through separate thoracotomy or decortication of pars and facets through the intermuscular plane established by the percutaneous screws. Finally anterior approach can achieve more physiologic segmental curve restoration compared to posterior shortening osteotomy (eg; PSO), less blood loss and less pain. We do PSO only on the segment of already fused spine.

Deformity correction can be performed anterior along or combine with posterior instrumentation in one stage or over 2 stages. In two stage operation , interbody fusion was performed via an anterolateral approach at all levels of the lumbar spine during the first stage ,intended to be included in the final construct. The patient was kept as an inpatient and mobilized postoperatively. They were then re-imaged with standing films. The second stage performed after 7d and involved percutaneous instrumentation of all levels. As a systematization of multiple MIS techniques combined, in a specific and staged manner, this MIS anterior reconstruction could provide a safe and effective approach to the management of ASD.

The aim of this paper is to introduce technique ALIF , its pearls and pitfall, its advantages compare to posterior along approache in ASD surgery base on authors 30-year experience of ALIF.

1F Ball Room B

7/14 (Fri) 14:00-14:10

Speaker



**Professor Gabriel Liu** (Singapore)

- ▶ Associate Professor Department of Orthopaedic Surgery Yong Loo Lin School of Medicine National University of Singapore
- ▶ Head & Senior Consultant University Spine Centre Department of Orthopaedic Surgery, National University Hospital
- ▶ Core Faculty NUHS Residency Programme Department of Orthopaedic Surgery, National University Hospital

**MIS Circumference Adult Deformity Surgery**



## Speaker



**Professor**  
**Po Liang Lai** (Taiwan)

- ▶ Director of the Center for Academia and Industry Collaboration.
- ▶ Chief of the Spine Section in the Department of Orthopedic Surgery at Chang Gung Memorial Hospital Linkou Branch.
- ▶ Professor of Medical College at Chang Gung University.

## Adult Spinal Deformity – Strategies for Treatment

Adult spinal deformity (ASD) refers to abnormalities in the thoracic or thoracolumbar spine that occur during the aging process. While it is not uncommon for adolescent spinal deformities to persist into adulthood, the most common causes of spinal deformity in adults are iatrogenic flatback and degenerative scoliosis. Diagnosis involves physical examination, focusing on gait and posture, along with radiographic assessment, and risk stratification indices are used for treatment planning. Non-operative treatment is typically the first-line approach, although surgical interventions yield favorable outcomes. The use of assistive devices such as crutches or rollators can play a significant role in managing pain in adults with spinal deformity. When individuals with spinal deformities experience pain or difficulty with walking, these devices can provide support and stability, enabling them to maintain mobility and independence. Proper alignment of the spine is crucial for maintaining an efficient standing posture and balance. Outcomes data demonstrate the clinical impact of spinopelvic malalignment and serve as the basis for realignment strategies. There is a proven correlation between specific radiographic parameters and self-reported pain and disability in patients. Considering the complex relationship between the spine and pelvis in maintaining posture, as well as the wide range of "normal" parameter values, a focus on global alignment and proportional values among individual parameters has been pursued to ensure clinical relevance when planning realignment for deformities across various clinical cases. Accurate assessment of ASD requires a comprehensive radiographic evaluation of both the spine and pelvis, including the cervical, thoracic, and lumbar regions, as well as the femoral heads and pelvis. Radiographic measurements should include evaluation of regional alignment (such as lumbar lordosis, thoracic kyphosis, C2-C7 lordosis), global alignment (including C7 SVA, C2-C7 SVA, and T1 pelvic angle). These radiographic parameters provide crucial information about how ASD patients maintain an upright posture and correlate with their pain and disability levels.



# Mobi-C



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台灣捷威醫療器材有限公司  
台北市內湖區瑞光路335號11樓



## Tumor & Infection

7/14 (Fri) 13:30-14:30

### Moderator



**Professor**

**Jae Yoon Chung** (Korea)

Prof. of Emeritus Chonnam Univ. Hospital  
Asia Pacific Orthopedic Association (APOA) – Chief National Delegate, Korea



**Professor**

**Masatsune Yamagata** (Japan)

Director of Oyumino Central Hospital Mobarra Clinic  
ISESS, International Society of Endoscopic Spine Surgery  
(executive committee 2018 Vice President of the 2nd meeting of ISESS)  
Japanese Society of Lumbar Spine Disorders (President 2015)



**Professor**

**Hsien Te Chen** (Taiwan)

Professor and Chairman of Department of Sport Medicine, College of Health Care, China Medical University, Taichung, Taiwan  
Director of Orthopedic Department, China Medical University Hospital, Taichung, Taiwan  
Director of Spine Center, China Medical University Hospital, Taichung, Taiwan



**Professor**

**Tawechai Tejapongvorachai** (Thailand)

Professor of Emeritus Tawechai Tejapongvorachai .MD, MSc.



Speaker



Professor

**Ching Hsiao Yu** (Taiwan)

- ▶ Spine Chief, Department of Orthopaedic Surgery, Taoyuan General Hospital, Ministry of Health and Welfare, Taiwan
- ▶ Director, Taiwan Society of Endoscopic Spine Surgery (TSESS)
- ▶ Secretary General, Taiwan Society of Minimally Invasive Spine Surgery (TSMISS)

## Early Intervention with Full-Endoscopic Debridement and Drainage(FEDD) Treating Various Spine Infection. A Current Trend of Spine Infection Treatment in Taiwan

### Introduction

In recent years, full-endoscopic debridement and drainage (FEDD) is gaining popularity treating spondylodiscitis. Comparing to traditional open surgery, FEDD possess many advantages including lower anesthesia risk and minimal invasiveness.

In Taiwan, early intervention with FEDD has become main-stream for spine infection treatment along with popularity and progress of endoscopic spine surgery (ESS).

### Methods

“Early intervention and minimally invasive surgery” is our primary strategy to treat spine infection. We think that early “surgical” intervention with “least-invasive” endoscopic procedure could have following advantages: obtaining bacterial culture as soon as possible, early pain control, less bone-cartilage destruction and minimizing approach-related complications.

Surgical approaches of FEDD include transforaminal and interlaminar technique. Selection of surgical approach depends on the location of spine infection. “Trocar-rotating technique” is a novel method to treat psoas muscle abscess. Additional instrumentation is suggested in complicated patients with unstable spinal segment.

### Results

Various types of spine infection treatment and surgical techniques with FEDD will be introduced. These cases included spondylodiskitis of cervical, thoracic and lumbar spine, epidural abscess, psoas abscess and paraspinal abscess.

### Conclusion

FEDD is a safe and effective MIS procedure treating various kinds of spine infection. We hope that, FEDD surgery will be the first-line surgery method to treat spine infection globally in the near future

## Speaker



### Professor

## Masatsune Yamagata (Japan)

- ▶ Director of Oyumino Central Hospital Mobara Clinic
- ▶ ISESS, International Society of Endoscopic Spine Surgery (executive committee 2018 Vice President of the 2nd meeting of ISESS)
- ▶ The Japanese Society of Lumbar Spine Disorders (Director President 2015)

## Hyperbaric Oxygen Therapy for Spinal Infections

Masatsune Yamagata, Mitsuhiro Hashimoto  
Oyumino Central Hospital Mobara Clinic, Chiba Rosai Hospital

### Purpose

Infectious conditions of the spine are often difficult to diagnose and treat. If the diagnosis is delayed and the start of treatment is delayed, highly invasive surgical treatment such as dissection of large lesions and spinal fixation will be required. This time, we tried a minimally invasive treatment for pyogenic spondylitis, that is, Hyperbaric Oxygen Therapy (HBO), and reported its clinical results.

### Methods

We tried HBO treatment as the first choice for 31 patients who visited our hospital and were diagnosed with pyogenic spondylitis. The HBO treatment was carried out 15 to 20 times by loading 2 atmospheres for 60 minutes in a space of pure oxygen. We examined the course of the inflammatory reaction, the method of drainage, and the cases that required final surgery.

### Results

Twenty-nine of the 31 cases improved with this treatment, and no surgery other than drainage was performed. Spinal fusion surgery was performed in two cases in which bone destruction had progressed during this treatment and may have increased spinal instability. As a side effect, otitis media developed in 2 cases, which was relieved in a short period of time.

### Conclusions

Early diagnosis is important for suppurative spondylitis. If the lesion can be drained as early as possible and HBO can be performed, remission of the infection can be obtained in many cases. This method, which can be combined with early endoscopic drainage, is minimally invasive and may be the first choice for treating spondylitis.



## Speaker



### Professor

## Jin Sung Park (Korea)

- ▶ Associate professor, Department of Orthopedic Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine.
- ▶ College of Medicine, Hanyang University Graduated with B.A. Degree in Medicine in Feb. 2008
- ▶ Graduate School, College of Medicine, Hanyang University Graduated with Master' degree
- ▶ Graduate School, College of Medicine, Hanyang University Graduated with Ph D. Degree

## Less Invasive Approach in Metastatic Spinal Tumor

Department of Orthopedics, Samsung Medical Center,  
Sungkyunkwan University, School of Medicine, Seoul, Korea  
Jin-Sung Park

### Introduction

In cases of metastatic spinal tumor, surgical treatment is necessary when a tumor develops in the vertebral body, leading to pathological fractures or neurological symptoms such as paralysis. With the advancement of cancer treatment technologies, the life expectancy of cancer patients has increased, emphasizing the importance of ensuring favorable long-term outcomes for metastatic spinal tumor surgeries. While aggressive surgical treatments and extensive reconstruction were previously employed to reduce tumor recurrence, the recent advancements in radiation therapy technology have shifted the role of surgical treatment in metastatic spinal tumor towards symptom alleviation using less invasive approaches.

### Main Discussion

In metastatic spinal tumor, when pathological fractures occur and cause instability, screw fixation is necessary. Recent literature reports indicate that the frequency of implant failure in metastatic spinal tumor using screw fixation alone, without bone union, is as low as 7%. Therefore, considering the high frequency of wound-related complications in surgical treatment for metastatic spinal tumor, percutaneous pedicle fixation is a useful procedure for obtaining stabilization. Another concern during metastatic spinal tumor surgery is the extent of tumor removal. While the ideal would be to remove as much of the remaining tumor in the vertebral body as possible, the heavy bleeding that follows can make the surgery more difficult or increase the risk of postoperative complications. Therefore, researching the significance of extensive tumor removal in reducing recurrence is important when addressing metastatic





spinal tumors. In our study, we analyzed symptom recurrence based on the extent of tumor removal in patients with metastatic spinal tumors invading the three columns of the vertebral body, and the extent of tumor removal did not affect the difference in symptomatic local recurrence. Considering that 72.2% (8 out of 11) of patients who underwent total en-bloc spondylectomy for metastatic spinal tumor showed recurrence as well, it is difficult to believe that extensive tumor removal is an essential factor for preventing recurrence. Furthermore, recent advancements in radiation therapy, such as Stereotactic Body Radiation Therapy (SBRT), have made it possible to deliver high radiation doses to the remaining tumor, resulting in good outcomes with separation surgery, which involves removing only the tumor around the spinal cord and performing SBRT. Although not performing bone union without anterior support after removing metastatic spinal tumors is less invasive, there is a lack of literature reports on whether it can maintain favorable long-term results without causing implant failure. We compared cases in patients with three-column vertebral body invasion, where the tumor was either removed up to the anterior part with anterior support provided, with cases where the anterior tumor was partially removed and only posterior fixation was performed. No difference was observed in the frequency of implant-related complications. Although further research is needed, it may be an efficient treatment method for metastatic tumor patients in terms of being less invasive, to remove the tumor only to the extent necessary for symptom relief and reconstruct with posterior fixation alone. While a fixation range of two segments above and below the metastatic vertebral body would be ideal for maintaining stability, it can be reduced to one segment above and below depending on the extent of tumor invasion in the vertebral body and the type of metastatic tumor (osteoblastic or osteolytic). Techniques such as cement insertion with screw fixation or the additional rod using a connector are viable methods for reducing the complications associated with implant failure that may occur with posterior fixation alone.

#### Conclusion

In the case of metastatic spinal tumors, their presence already indicates stage 4, and many patients experience poor overall health due to primary cancer treatments, including chemotherapy. Since the treatment objective for metastatic spinal tumors is not complete cure, it is not always necessary to completely remove the tumor. Instead, the goal of treatment is to manage the tumor in a way that prevents symptom recurrence throughout the patient's survival period, depending on their response to primary cancer treatment. Additionally, considering that wound healing may be compromised due to radiation therapy and other treatments, it becomes essential to establish a cost-effective stabilization plan utilizing less invasive methods.



Speaker



**Professor Naresh Kumar** (Singapore)

- ▶ Senior Consultant, University Spine Centre, Department of Orthopaedic Surgery, National University Hospital
- ▶ MBBS (AIIMS); MS Orth. (AIIMS); DNB Orth.; FRCS Ed.; FRCS (Orth & Trauma); DM (Orth Spinal Surgery) (Univ. of Nottingham)

## When I Will Not Choose MIS Techniques For Metastatic Spinal Tumor ?

Study Design.

Author's own experience and relevant literature around this topic.

Aim of this talk

To develop an instructional talk for the above-mentioned topic of conditions and situations for not using MIS techniques in metastatic spine tumour surgery (MSTS).

Content of this talk

MIS techniques have now been established as a technique to reduce surgical morbidity, blood loss during surgery and reduce the length of stay of patients with metastatic spine disease (MSD). The two main groups of MIS techniques would be: a) vertebroplasty/kyphoplasty b) percutaneous pedicle screw fixation (PPSF) and c) minimal access decompression surgery which may include separation surgery and partial corpectomy. I was one of the first users from 2008 onwards of PPSF for MSTS. I also have evolved the technique of "separation surgery" in MSTS over the last decade. From our published literature, it is quite clear that MIS has a great place in managing MSD. However there are still situations where MIS techniques may not be feasible or appropriate despite its advantages. The conditions and situations are as follows:

Location of the tumour – cervical thoracic, occipito-cervical or sacral region are best approached and operated by open technique rather than MIS.

Surgery type – enbloc vertebrectomy is an operation best done by open technique due to both technical and surgical considerations.



Patient profile – children are best done by open technique as MIS instrumentation are not very well developed for them. Small statured patients similar to children would require open technique as the landmarks of two continuous vertebra will be very close to each other. Very young patients where spinal fusion was intended would require open technique to achieve solid fusion.

Tumour type – hypersclerotic lesions like in prostate and certain breast tumours are best operated by open technique as these lesions can be very difficult to cannulate with MIS probes. Hypervascular tumours are preferably managed by open technique as control of bleeding is always more feasible with open technique. Similarly, hypervascular tumours where embolization has failed would logically require open techniques.

Technical considerations – patients with previous operative exposure to the intended area of surgery would require open approach.

Miscellaneous consideration – lack of technical support i.e. inexperienced radiographers, inappropriate surgical kits are relative contraindications for considering MIS techniques.

Of all the above mentioned are conditions the experience of the surgeon and the surgical team can definitely override a lot of these conditions and factors mentioned. There is always a place for conversion to open surgery if an attempted MIS surgery is unable to provide expected outcomes in patients undergoing MSTs.

Speaker



**Professor Fumitake Tezuka** (Japan)

- ▶ Lecturer, Department of Orthopedics, Tokushima University
- ▶ MD degree, Jichi Medical School, Tochigi, Japan
- ▶ PhD degree, Tokushima University, Tokushima, Japan
- ▶ Board certified spine surgeon approved by The Japanese Society for Spine Surgery and Related Research

## MIS Spinal Cord Tumor Resection with VR/AR Technology

**Purpose:** With the development of information and communication technology, the advanced techniques such as augmented reality (AR) or virtual reality (VR) technologies have been applied in the medical field. AR is a novel technology of overlaying the virtual information in the real world and recently available in the clinical setting. Thanks to the development of the operating microscope, microscope-based AR technology (AR microscope) was used in cranial neurosurgery in 1990s. Implementation of AR microscope support in spine surgery have been reported since 2018. Purpose of this study is to clarify the utility of AR microscope for spinal cord tumor surgery.

**Materials and methods:** We evaluated 20 patients including 9 male and 11 female who were diagnosed with spinal cord tumor and underwent tumor resection in our hospital. We created three-dimensional (3D) fusion images from preoperative magnetic resonance images (MRIs) and computed tomography (CT) scans using BrainLAB Curve navigation platform (BrainLAB AG, Munich Germany) and Smartbrush software (BrainLAB AG). After intraoperative surface registration, 3D fusion images were overlaid as AR navigation images in the surgical microscope (KINEVO 900, Carl Zeiss, Oberkochen, Germany). We evaluated the accuracy of registration and the navigation mismatch between tumors and AR navigation images.



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Results: Their average age was 61.1 years old (3 to 85 years old). Types of tumor were 3 cervical dumbbell tumors, 9 thoracic intradural spinal cord tumors (3: intramedullary, 4: intradural extramedullary, 2: extradural), and 8 lumbosacral spinal cord tumors (6: dumbbell type, 2: cauda equina tumor). Gross total resection was conducted in 14 cases, and subtotal resection was done in 6 cases including scheduled two-staged surgery, metastatic spine tumor resection, and giant dumbbell type tumor resection. Their Modified McCormick scales revealed no remarkable changes between before and after tumor resection (I: 10->11, II: 4->3, III: 3->4, IV: 3->2). Intraoperative surface registrations were very accurate (less than 1 mm) except 1 case of thoracic intradural extramedullary tumor which had difference between preoperative and intraoperative spinal alignments. Two cases of mobile cauda equina tumor had the navigation mismatch between intradural tumor and AR navigation image.

Conclusions: AR microscope can visualize the anatomical structures such as muscle, nerve, bone, vessel, and tumor reconstructed by preoperative MRIs or CT images on the surgical field through the heads-up-display. Therefore, we could safely resect the complicated spinal cord tumors. This technology helped us to understand the anatomical landmark even during revision surgery which was in the surrounding scar tissue. AR microscope is now available for these complicated cases. In the future, the application of AR technology in spine surgery is expected to expand, and it must be used appropriately.



## Free Papers 2

### Moderator



**Professor**

**Zairin Noor** (Indonesia)

Head of Spine Division, Department of Orthopaedic Surgery,  
Ulin General Hospital/Faculty of Medicine Lambung Mangkurat  
University

Head of Professoral Study Program in Medical and Health,  
Lambung Mangkurat University



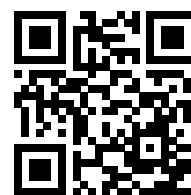
**Professor**

**Ting Kuo Chang** (Taiwan)

Chief, Department of Orthopedics Mackay Memorial Hospital,  
Taipei, Taiwan

Faculty, Department of Orthopedics Mackay Memorial Hospital,  
Taipei, Taiwan

Chief, Hyperbaric medicine center, Mackay Memorial Hospital



SCAN ME



## Speaker

- |       |   |  |
|-------|---|--|
| F2-1  | <b>Takashi Chikawa</b><br>(Japan)       | Surgical Management of Sagittal Imbalance in Adult Degenerative Thoracolumbar Kyphoscoliosis: Preoperative Planning Using Computed Tomography in the Supine Position                             |
| F2-3  | <b>Miniori Kato</b><br>(Japan)          | Comparative Study of Posterior Surgery for Lumbar Spine Diseases with Lateral Listhesis and Scoliotic Disc Wedging - Minimally Invasive Decompression vs. Transforaminal Lumbar Interbody Fusion |
| F2-4  | <b>Yen Jen Chen</b><br>(Taiwan)         | Prone Position in Jackson Table Can Get Better Segmental Lordosis Than Lateral Position in LLIF/OLIF Surgery   |
| F2-5  | <b>Tetsutaro Mizuno</b><br>(Japan)      | Evaluation of Indirect Decompression in Lumbar Interbody Fusion with Unilateral Biptoral Endoscopy - Compared to LLIF  |
| F2-6  | <b>Hsien Te Chen</b><br>(Taiwan)        | Minimally Invasive Spine Surgery for Post-traumatic Deformity: Retrospective Cases Analysis and Systemic Literatures Review  |
| F2-7  | <b>Chien-Chun Chang</b><br>(Taiwan)     | The 3D Computed Assisted C Arm Free Navigation Application In Minimally Invasive Spine Surgery: A Case Series and Technical Note   |
| F2-8  | <b>Warat Tassanawipas</b><br>(Thailand) | Simultaneous OLIF and UBE in Simple Position   |
| F2-9  | <b>Masashi Kumon</b><br>(Japan)         | Microscope-based Augmented Reality Navigated Pedicle Screw Insertion for Thoracolumbar Spine Diseases  |
| F2-10 | <b>Meng Huang Wu</b><br>(Taiwan)        | Applications of Artificial Intelligence and Machine Learning for the Predictions of Interbody Cage Height and Postoperative Alignment in Transforaminal Lumbar Interbody Fusion                  |
| F2-2  | <b>Yi Jen Ho</b><br>(Taiwan)            | Minimally Invasive Treatment for Adolescent Idiopathic Scoliosis using 3D Navigator with Hybrid OR   |



## Free Papers 3

### Moderator



**Professor**

**Jae Hyup Lee** (Korea)

Professor, Department of Orthopaedic Surgery, Seoul National University College of Medicine  
President and CEO of SMG-SNU Boramae Medical Center, Seoul, Korea



**Professor**

**Ming Hsiao Hu** (Taiwan)

Assistant Professor, Orthopedics, National Taiwan University College of Medicine, Taipei, Taiwan



SCAN ME





## Speaker

F3-1	<b>Chia Yu Lin</b> (Taiwan)	Clinical and Radiological Subsequence of Spinal Endoscopic Surgery for Infectious Spondylodiscitis: 5-year Follow-up Cohort Study
F3-2	<b>Jiro Hirayama</b> (Japan)	Full-Endoscopic Disc Debridement And Continuous Local Antibiotic Perfusion Therapy for Pyogenic Spondylitis
F3-3	<b>Ta Yuan Yu</b> (Taiwan)	“Trocar rotating method” of Full-Endoscopic Debridement and Drainage Treating Lumbar Psoas Abscess. A Technique Note
F3-5	<b>Naresh Kumar</b> (Singapore)	Implant and Construct Decision Making in Metastatic Spine Tumour Surgery: What are the Important Factors We Need to Weigh Pre-operatively?
F3-6	<b>Naresh Kumar</b> (Singapore)	Role of Icotec Carbon Fiber Implants for Spine Tumour Disease – A Multicentre Singapore Experience
F3-7	<b>Sung Cheol Park</b> (Korea)	A New Grading System for Endplate Spur in Lumbar Foraminal Stenosis
F3-8	<b>Kosuke Sugiura</b> (Japan)	Clinical Features of Bone Marrow Edema Lesions of the Posterior Elements in the Lumbar Spine among Symptomatic Adults
F3-9	<b>Hidetomi Terai</b> (Japan)	Clinical Features of Tight Film Terminale and its Surgical Outcome
F3-10	<b>Chun Tseng</b> (Taiwan)	High Glucose Inference the Intervertebral Disc Fibrosis via NF-κB Pathway
F3-11	<b>Kuo Yuan Huang</b> (Taiwan)	Correlation of the Degenerative Stages of Intervertebral Disc with Magnetic Resonance Imaging, Chemical Composition, and Biomechanical Properties of the Nucleus Pulposus



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## Degenerative Spinal Diseases

7/14 (Fri) 16:00-17:00

### Moderator



**Professor**

**Heui Jeon Park** (Korea)

Honorary Professor of Yonsei University

Sept. 2006-Aug. 2007 : President, PSMISS

Apr. 2009-Mar. 2012 : Chairperson, AO Spine Korea



**Professor**

**Komang Agung Irianto** (Indonesia)

Senior Lecturer, Associate Professor in Orthopaedic  
Department, Airlangga University, Surabaya, Indonesia.



**Professor**

**Tsai Sheng Fu** (Taiwan)

Chairman of Department of Orthopaedic Surgery, Chang  
Gung Memorial Hospital, Linkou.

Professor of Chang Gung University & National Tsing Hua  
University, College of Medicine.

President of Taiwan Bone Muscle Joint Total Care Association  
(TBMJ).

Speaker



**Professor**  
**Hidetomi Terai** (Japan)

- ▶ Associate Professor of Orthopaedic Surgery, Osaka Metropolitan University Graduate School of medicine
- ▶ 2019 ISSLS Prize of clinical science (Co-winner)
- ▶ 2019 Best presentation award in 26th meeting of JPSTSS (Japan Society for the Surgical Technique for Spine and Spinal Nerves)

## Positive Effects of Minimally Invasive Decompression Surgery for Lumbar Spinal Stenosis

Hidetomi Terai, Hiromitsu Toyoda, Akinobu Suzuki, Shinji Takahashi, Koji Tamai, Minoru Kato, Hiroaki Nakamura  
Dept. of Orthopaedic Surg., Osaka Metropolitan Univ. Graduate School of Medicine. Osaka, Japan

(Background) The history of minimally invasive decompression surgery began in the late 1970s with microscopic surgery for herniated discs, which was applied to lumbar spinal stenosis and then became a golden standard for lumbar decompression. We have been performing bilateral decompression via a unilateral approach under a microscope since the 1990s, which has gradually changed to using microendoscope in our institution.

(Purpose) The objective of this study was to clarify the positive effects of minimally invasive decompression for lumbar spinal stenosis using bilateral decompression via a unilateral approach.

(Methods) We investigated data from 168 patients (mean age,  $69.5 \pm 9.2$  years) who underwent bilateral microscopic/ microendoscopic decompression via a unilateral approach and were followed up for more than five years. Outcomes were self-reported visual analog scale (VAS) scores for low-back pain, leg pain, and leg numbness and



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physician-assessed Japanese Orthopaedic Association (JOA) scores for back pain. Spino-pelvic parameters were measured using standing whole spine X-ray at 2 and 5 years postoperatively which were compared to those taken preoperatively.

(Results) VAS of LBP, leg pain and leg numbness significantly improved and maintained at latest follow-up. The mean JOA score also significantly improved in all patients from 13.4 points before surgery to 24.1 points at the latest follow-up (mean recovery rate 67.8%). Degeneration at the decompression and its adjacent level was observed in 43.5% and 20.5% respectively. There was no significant difference in the clinical outcomes between patients with and those without degeneration. Lumbar lordosis (LL), sacral slope (SS), pelvic tilt (PT), and pelvic incidence-LL (PI-LL) had significantly improved and maintained for five years after surgery.

(Conclusions) Bilateral decompression via a unilateral approach using microscope or microendoscope has positive effects on degenerative progression and spinal alignment that may be resulted by avoiding destructive changes to the muscle or facet joints.

Speaker



**Professor**  
**Jae Hyup Lee** (Korea)

- ▶ Professor, Department of Orthopaedic Surgery, Seoul National University College of Medicine
- ▶ President and CEO of SMG-SNU Boramae Medical Center, Seoul, Korea
- ▶ Ph.D. Orthopedic Surgery from Seoul National University, College of Medicine
- ▶ Master Degree from Korea University, Graduate School
- ▶ M.D. degree from Seoul National University College of Medicine

## Strengths and Weaknesses of Mis-Tlif in Posterior Lumbar Fusion Surgery

Jae Hyup Lee, M.D., Ph.D  
Department of Orthopaedic Surgery, Seoul National University, College of Medicine, Seoul, Korea

Backgrounds: MIS-TLIF has a relatively small wound compared to conventional PLIF, so there is less soft tissue damage and several advantages. However, since MIS-TLIF requires a learning curve, it takes longer to become an expert and has some disadvantages compared to open surgery. Therefore, the purpose of this lecture is to identify the advantages and disadvantages of MIS-TLIF over conventional open fusion surgery.

Main body: The advantages of MIS-TLIF over conventional lumbar fusion surgery include less damage to soft tissues such as multifidus muscle and less exposure of nervous structures, resulting in less neuropraxia and less postoperative pain. In addition, MIS-TLIF has significantly less bleeding during and after surgery than open TLIF, and the use of opioids after surgery is also significantly less, so the hospital stay is significantly shorter. However, MIS-TLIF has limitations in securing the field of vision for the targeted anatomy, and has a steep learning curve and long operation time. In addition, since MIS-TLIF performs percutaneous screw fixation, radiation exposure is relatively high and the fusion rate is lower than open PLIF or TLIF. In addition, since



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MIS-TLIF performs percutaneous screw fixation, radiation exposure is relatively high and the fusion rate is lower than open PLIF or TLIF.

Conclusions: MIS-TLIF has several disadvantages compared to open fusion surgery, but after the learning curve period, the operation time becomes shorter and radiation exposure occurs only slightly. Also, with the development of osteoinductive bone substitutes such as rhBMP-2, the fusion rate is also improving. Therefore, the advantages of MIS-TLIF are expected to play a more important role in selecting the surgical method for lumbar fusion surgery.

Speaker



**Professor**  
**Shu Hua Yang** (Taiwan)

- ▶ Professor of Orthopedics at National Taiwan University
- ▶ Chief of Spine Surgery in Department of Orthopedics at National Taiwan University Hospital
- ▶ President of the Taiwan Spine Society

## MIS vs Open Posterior Spinal Fusion for Low Grade Spondylolisthesis

Shu-Hua Yang  
Department of Orthopedics, Nation Taiwan University, Taipei, Taiwan

Only 10% to 15% of patients with degenerative spondylolisthesis require surgery. Surgery is recommended for patients with low-grade degenerative spondylolisthesis whose symptoms are unbearable and intractable to non-surgical treatment. In general, patients complaining predominantly of neurogenic claudication or radiculopathy tend to have more improvement than those experiencing primarily axial low back pain. Multiple studies have found satisfaction rates of 85-90% in the surgical patients. A number of surgical options are available to manage degenerative spondylolisthesis including decompression and spinal fusion. The goal of spine fusion is to eliminate the motion and then consequently reduce the pain caused. Interbody fusion may improve fusion rates and can be performed via numerous surgical approaches. Posterior spinal fusion especially transforaminal lumbar interbody fusion (TLIF) is introduced in this presentation.

Open surgery procedures involve complete exposure of posterior elements of the spine. Minimally invasive surgery (MIS) procedures include percutaneous, mini-open,





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and muscle-splitting approaches to the spine. MIS techniques have several potential benefits including minimizing postoperative pain, shortening recovery, reducing blood loss, minimizing soft tissue damage, maintaining paraspinal structural integrity, and minimizing scar tissue. In the literature, MIS spinal fusion for spondylolisthesis was associated with lower intraoperative blood loss, shorter hospital stay but longer operative time than open spinal fusion. Rates of complications, pain and functional improvement were comparable between two surgical techniques. MIS-TLIF and open-TLIF have comparable long-term clinical outcomes. MIS-TLIF seems to be an effective and safe alternative to traditional open-TLIF in the long term.

Endoscopic spine surgery is getting more and more popular around the world. Endoscopic TLIF (Endo-LIF) is the new frontier of endoscopy-assisted surgery. The advantages of Endo-LIF include confirming contralateral decompression and accessing endplate preparation. Although Endo-LIF has a long operative time and is associated with a steep learning curve, the current evidence showed comparable clinical efficacy and safety between Endo-LIF and MIS-TLIF.

In summary, MIS-TLIF was associated with lower intraoperative blood loss, shorter hospital stay but longer operative time than open TLIF with comparable complication rates and pain/functional improvement. Endo-LIF further reduces the invasiveness of surgical procedures for degenerative spondylolisthesis.

Speaker



Professor

**Motonobu Natsuyama** (Japan)

- ▶ Vice-President: Shima Neurosurgical Orthopedic Hospital
- ▶ Chief Surgeon: Kantoh Rosai Hospital

## Minimal Access Decompression Surgery in Lumbar Degenerative Disease

Smith & Foley started MED in 1995.

We started MED for lumbar disc herniation from 1998, and for decompression of lumbar spinal canal stenosis from 2000.

The purposes of this presentations are to evaluate the effectiveness in lumbar degenerative disease, and present Microendoscopic muscle-preserving interspinous inter-laminar decompression technique (ME-MILD) and to show the newest Endoscopic En Bloc Lumbar Flavum Extraction by Harmantya Mahadhipta By ME-MILD, we do not need to sacrifice facet joints too much.

ME-MILD is so effective for higher lumbar spine (L1/2,2/3,3/4). Harmantya Mahadhipta achieved ideal Endoscopic En Bloc Lumbar Flavum Extraction with shorter operative time, and no dural tear.



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## Note

Handwriting practice area with a solid top line and multiple dotted lines for writing.



Speaker



**Professor**  
**Zhaomin Zheng** (China)

- ▶ Professor and Doctoral Supervisor at the First Hospital of Sun Yat-sen University.
- ▶ Director of the Pain Research Center of Sun Yat-sen University.

## Fusion Rate with Stand-Alone Mini-open Lateral-anterior Lumbar Interbody Fusion (LaLIF)

Zhaomin Zheng<sup>1,2,\*</sup> Xingyu Guo<sup>1</sup> Jianru Wang<sup>1</sup>

<sup>1</sup>Department of Spine Surgery, The First Affiliated Hospital of Sun Yat-sen University, Guangzhou 510080, P.R. China <sup>2</sup>Pain Research Center, Sun Yat-Sen University, 510080 Guangzhou, China.

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Address: No. 58, Zhongshan 2nd Road, Guangzhou, China 510080

### Study Design

Retrospective radiographic analysis.

### Objective

The objective of this study was to assess the fusion rate of stand-alone mini-open lateral-anterior lumbar interbody fusion (LaLIF) for degenerative lumbar diseases.

### Background

Early clinical reports of stand-alone LaLIF have shown reliable mid-term clinical outcomes and an acceptable complication profile when compared to traditional LLIF.

### Methods

We studied patients who underwent standardized LaLIF surgery with implant packed with demineralized bone matrix allograft without rhBMP-2. Each patient was assessed clinically and radiologically at each follow-up visit using standard methods. The surgical segment fusion indices mainly include the disappearance of lucency shadow around the Cage, the formation of bone bridges in or around the Cage, the disappearance of the autogenous endplate in plain X-ray or CT scan, and if necessary, combined with the improvement of the patient's symptoms. The fusion rate is expressed in percentage (%).



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### Results

The participants were patients who underwent LaLIF surgery under the diagnosis of degenerative lumbar diseases between April 2016 and April 2020. All 34 cases involving 47 levels were performed LaLIF surgery, 1 level in 21 cases (61.8%), 2 levels in 13 cases (38.2%). We achieved a 91.5% (43 of 47 levels) fusion rate using instrumented allograft.

### Conclusion

The fusion rate for levels of LaLIF surgery reached 91.5% which is comparable to those for conventional LLIF. And we considered that precise surgical indications have obviously contributed to fusion rate in LaLIF.

Keywords: Fusion Rate; LaLIF; Stand-Alone; Subsidence



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## Cervical Spine

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### Moderator



**Professor**

**Ming Chau Chang** (Taiwan)

Chief, Department of Orthopedics Taipei Veterans General Hospital



**Professor**

**Chi Chien Niu** (Taiwan)

Professor, National Education Department  
President of Taiwan Spine Society  
Vice Chairman, Orthopaedic Department. Chang Gung Memorial Hospital  
Chief of Spinal Section, Orthopaedic Department. Chang Gung Memorial Hospital



**Professor**

**Chung Hwan Kim** (Korea)

Department of Orthopaedic Surgery, Gangneung Asan Hospital,  
University of Ulsan Medical College, Full Professor

Speaker



Professor

**Jui Teng Chien** (Taiwan)

- ▶ Superintendent, Buddhist Douliou Tzuchi Hospital, Yunlin, Taiwan
- ▶ Vice superintendent, Buddhist Dalin Tzuchi Hospital, Chiayi, Taiwan
- ▶ Assistant Professor in Orthopedic surgery College of Medicine Tzuchi University, Hualien, Taiwan

## Surgical Treatment for Atypical Symptoms of Cervical Spine

Jui-Teng Chien, MD, PhD  
Buddhist Douliou/Dalin Tzuchi Hospital, TAIWAN

OBJECTIVE:

Among the atypical symptoms caused by cervical disc degeneration, cervical vertigo is characterized by paroxysmal or constant vertiginous attack. Both the diagnosis and treatment are challenging and still under hot debate. Here we reviewed the mid- to long-term outcome of anterior cervical discectomy and fusion (ACDF) for the treatment of cervical vertigo.

METHODS:

From 2009 to 2022, 64 patients with cervical vertigo were treated with ACDF, including 12 men and 52 women with an average of 45.4 years. The severity of vertigo and associated sympathetic symptoms was assessed by 3-point vertigo severity score and 20-point autonomic nervous system (ANS) dysfunction score respectively. JOA score was used to evaluate the overall neurological function. The overall satisfaction was rated by modified MacNab criteria.

RESULTS:

The patients were followed up for an average of 32.4 months (range, 14-92 months). Postoperatively, the ANS score improved from 13.3 to 7.3, and the severity of vertigo decreased from 2.6 to 1.4. There were no major intra-operative complications. Solid interbody fusion was seen in all cases, with one-level in 11, 2-level in 34, 3-level in 15, and 4-level in 4. The C5/6 disc was the most frequently involved level. The overall satisfaction by modified MacNab criteria was excellent, 17 cases; good, 31 cases; acceptable, 9 cases; and poor, 7 cases, with an efficacy of 89% (57/64).

CONCLUSION:

For intractable vertigo of cervical origin, ACDF is a safe and effective procedure. The mid- to long-term efficacy and overall satisfaction in our patients is high. Aside from vertigo, ACDF can also deal with the associated sympathetic and sensorimotor symptoms. Successful clinical and radiographic results are attributed to accurate diagnosis, comprehensive preoperative assessment, and adequate intra-operative decompression and fusion.



Speaker



**Professor**  
**Chien Hua Chen** (Taiwan)

- ▶ Neurosurgeon of Clive Chen Clinic and Yuan Rung Hospital, Dedicated to Pain Management and Neuro-restoration
- ▶ Research Scholar specializing in neuromodulation and pain management, UCLA
- ▶ Ph.D graduate of Department of Biomedical Engineering, National Taiwan University

## Sono-guided Intervention for Cervical Spine

Image-guided interventions of cervical spine include targeting of cervical spine disc, nerve root, stellate ganglion, and cervical facet/medial branch. In comparison with X-ray guidance, ultrasound can visualize soft tissue which is not seen by C-arm fluoroscope. In this way, ultrasound helps to avoid injury of nerve root or critical vascular structures like vertebral artery.

With ultrasound guidance, it reduces the radiation exposure of the physician. The patient also has less discomfort during the procedure in comparison with X-ray guidance. The nerve roots are not visualized by X-ray and might be punctured during the X-ray guidance, which may cause significant discomfort of patient. Cervical spine nerve root is well- visualized by ultrasound and such discomfort can be avoided.

Ultrasound also helps to complement the blind spot of the diagnosis of cervical spine radiculopathy. It helps to diagnose the brachial plexus lesions.

Ultrasound-guided perineural vitamin B12 administration can be applied in the management of cervical spine neuroforamen narrowing and HIVD with nerve root irritation. Ultrasound-guided stellate ganglion block helps to alleviate sympathetic maintained pain. Ultrasound-guided intradiscal PRP can be used to treat discogenic pain. Ultrasound-guided interventions of cervical spine medial branch and third occipital nerve can be applied in the management of axial neck pain, cervicogenic headache, and whiplash injury-related pain.

Ultrasound visualizes soft tissue and X-ray visualizes bony structures. They are the best companions and complement each other.



## Speaker



### Professor

## Seok Woo Kim (Korea)

- ▶ Professor of Department of Orthopaedic Surgery, School of Medicine, Hallym University
- ▶ President of ISASS AP (International Society for the Advancement of Spine Surgery)
- ▶ Associate editor in "The Spine Journal", official journal of NASS (North American Spine Surgery),
- ▶ Deputy Editor in JASS (Journal of Advanced Spine Surgery)

## Cervical Arthroplasty in Multilevel Disc Diseases

Cervical disc arthroplasty (CDA) has emerged as a proven alternative to ACDF to treat cervical degenerative disc disease (DDD)

It is well known that CDA has the potential to reduce the incidence of ASD by preserving motion.

The safety and efficacy of CDA as a treatment for both single- and 2-level cervical disc diseases is now well established in the literature.

Long term studies have also proven its safety in both single and 2 level disc diseases, up to 7 years, the safety has been proven with long term clinical data supporting these excellent outcomes in terms of clinical success, reoperation rates, preserving motion and 2ndary surgeries.

In light of the extensive evidence now supporting the long-term safety of CDA at 1 or 2 levels, CDA has the potential to extend beyond 2 levels to treat multilevel cervical pathology.

There have been several clinical investigations comparing the safety and efficacy of single-level and multilevel CDA, however, these studies have comprised very small cohorts and short follow-ups.

Under these circumstances, we need to think about whether CDR surgery works better than other treatment options or fusion surgeries in multilevel disc disease.

It's because there are many unsolved areas that are still in debate, and I think more research is needed on what kinds of factors and how those potential factors will affect



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the outcomes when we operate on multiple levels at the same time.

Recently, a few studies have shown promising outcomes in treating multi-level disc diseases.

CDA has gained its credibility after taking into account the favorable outcomes consistent with long-term functional recovery, the rate of adverse events, the onset of adjacent segment disease, and the rate of subsequent surgeries at single or two level as well as multiple levels. But still though there's a long way to go.

In light of the extensive evidence now supporting the long-term safety of CDA at 1 or 2 levels and the some favorable outcomes at multiple levels, and the well-documented challenges after ACDF, we need to recognize that CDA has the potential to extend beyond 2 levels to treat multilevel cervical pathology.

Finding the right target for surgery is the most important factor in determining the future success or failure of this surgery and cannot be overemphasized.

There is still a long way to go and there are many problems to solve, but based on the data and information so far, I carefully predict that this CDA will have better results in the properly selected patient in the near future.



Speaker



**Professor**  
**Gabriel Liu** (Singapore)

- ▶ Associate Professor Department of Orthopaedic Surgery Yong Loo Lin School of Medicine National University of Singapore
- ▶ Head & Senior Consultant University Spine Centre Department of Orthopaedic Surgery, National University Hospital
- ▶ Core Faculty NUHS Residency Programme Department of Orthopaedic Surgery, National University Hospital

## C3 and or C7 Dome Hybrid Open Door Laminoplasty



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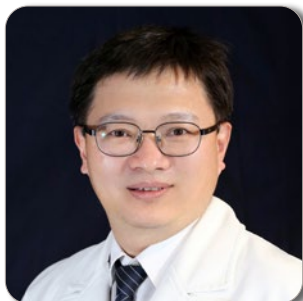
## Note

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Speaker



**Professor**  
**Wen Tien Wu** (Taiwan)

- ▶ Professor, School of Medicine & Institute of Medical Sciences, Tzu Chi University, Hualien, Taiwan
- ▶ Attending surgeon, Department of Orthopedics, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan
- ▶ Member of Taiwan Spine Society
- ▶ Member of Taiwan Society of Minimally Invasive Spine Surgery

## Less Invasive Laminoplasty and its Application in Cervical Myelopathy

Introduction:

Laminoplasty ( LP ) is best indicated in patients with multiple level cervical stenosis with myelopathy without instability, kyphosis or major anterior pathology. Compared with laminectomy only procedure, it can prevent perineural adhesion and late kyphosis. However, it still brings about some complications, esp. postoperative neck pain and C5 palsy. The C5 palsy is attributed to posterior drifting of spinal cord and roots tethering. Up to now, there are no effective methods to prevent C5 palsy.

Patients and Methods:

There are mainly 2 types of LP, open door LP developed by Hirabayashi and French door LP designed by Kurokawa. O'brien added miniplates over open sides of open door LP to avoid closure of laminae. I followed the techniques of O'brien to do C3 to C7 LP since 2005. The initial results showed good JOA recovery rates. However, there were high percentage of postoperative neck pain and 2.8% of C5 palsy, which urged me to modified the procedures since 2011. The essence of modified LP is less invasive. We preserved C7 spinous process and carefully repaired semispinalis cervicis. The subperiosteal dissection was done over left side without violation of facet joints. The C3-6 spinous processes were cut and retracted to do the bony trough over right side. Then, the left side laminae were opened and fixed with miniplates and screws.



The hinged and open side bony troughs were both medially placed without injury to bilateral facet joints.

#### Results:

The results of less invasive LP showed good JOA recovery rate, more preserved motion, less postoperative neck pain and no cases with C5 palsy compared with previous technique. We also applied less invasive LP with selective short fusion, either anterior or posterior, for those with multiple level stenosis and short segment instability, kyphosis, or anterior pathology. When the LP was used as a decompression method in conjunction with posterior instrumented fusion, the hinged side laminae could be served as a good fusion bed.

#### Discussion and conclusion:

Less invasive LP created good decompression and JOA recovery rate. There were no laminar closure. The neck motion was maintained better and C5 palsy and postoperative neck pain were decreased. It was combined with selective fusion to get good results for some instances.

## Free Papers 4

### Moderator



**Professor**

**Ki Tack Kim** (Korea)

President, Korean Orthopedic Association  
Honorable Director of Dongtan City Hospital, Gyeonggi Province, Korea  
Professor, College of Medicine Kyung Hee University Seoul, Korea



**Professor**

**Wen Hsiang Chou** (Taiwan)

Chief of Spine and General Orthopedic Division  
Department of Orthopedics Chen-Hsin General Hospital







## Speaker

- |       |                                     |   |
|-------|-------------------------------------|---|
| F4-1  | <b>Sang Ho Kim</b><br>(Korea)       | The Comparative Study of Intraoperative and Postoperative Factors of Biportal Endoscopic Lumbar Discectomy in Obese Patients and Non-obese patients         |
| F4-2  | <b>Hee Jung Son</b><br>(Korea)      | The Impact of Instrumented Lumbar Fusion Surgery on Psychiatric Problems in Elderly Patients with Degenerative Spinal Stenosis                              |
| F4-3  | <b>Akihiro Nagamachi</b><br>(Japan) | Dose Young Athletes with Early Stage Spondylolysis of the 4th Lumbar Spine Need to Interrupt Sports Activities for Bone Union?                              |
| F4-4  | <b>Saori Soeda</b><br>(Japan)       | Thirteen Years Follow-up of Direct Repair Surgery for a Pediatric Pars Fracture Using a Smiley Face Rod Technique   |
| F4-5  | <b>Yuta Sawada</b><br>(Japan)       | Does Continuation of Antiplatelet Medication Affect the Complication and Surgical Outcomes After Minimally Invasive Lumbar Posterior Decompression Surgery? |
| F4-6  | <b>Han Bin Jin</b><br>(Korea)       | Comparison of Adjacent Segmental Diseases after Minimally Invasive and Open Transforaminal Lumbar Interbody Fusion for 10 years                             |
| F4-7  | <b>Akinobu Suzuki</b><br>(Japan)    | Clinical Outcomes and Risk Factors for Poor Outcome in Microendoscopic Laminectomy for Lumbar Spinal Stenosis   |
| F4-8  | <b>Hao-Chun Chuang</b><br>(Taiwan)  | The Role of Leptin and Oxidative Stress in Obesity-Related Hypertrophy of the Ligamentum Flavum   |
| F4-9  | <b>Saori Soeda</b><br>(Japan)       | Type 1 Modic Change for Chronic Low Back Pain in High-class Athlete in Japan  |
| F4-10 | <b>Keisuke Ishii</b><br>(Japan)     | Usefulness of the Modified Transforaminal Approach Compared with the Full-Endoscopy Transforaminal Approach   |



## Free Papers 5

### Moderator



**Professor**

**Dong Eun Shin** (Korea)

Professor of Orthopaedic Surgery, CHA University School of Medicine

Director of Spine Center, CHA Bundang Medical Center



**Professor**

**Shih Hsiang Chou** (Taiwan)

Taiwan Orthopaedic Association

Taiwan Spine Society

Asia Pacific Orthopedic Association





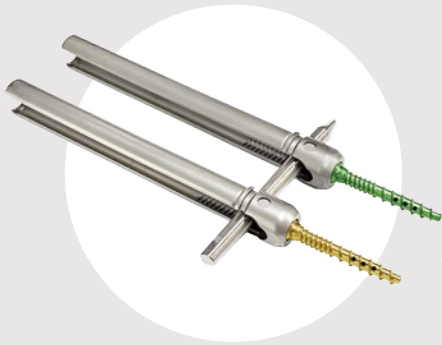
## Speaker

- |       |                                   |   |
|-------|-----------------------------------|---|
| F5-1  | <b>Woo Seok Jung</b><br>(Korea)   | The Changes in Neck Range of Motion after Laminoplasty according to Cervical Foraminal Stenosis   |
| F5-2  | <b>Wataru Narita</b><br>(Japan)   | Minimally Invasive Laminoplasty for Cervical Myelopathy: A Comparative Study  |
| F5-3  | <b>Sung Hoon Choi</b><br>(Korea)  | The Effect of Posterior Cervical Laminoplasty with Dome Laminotomy on Cervical Alignment and Disability in Patients with Cervical Spondylotic Myelopathy Patients |
| F5-4  | <b>Kanji Sasaki</b><br>(Japan)    | Making Posterior Cervical Surgery Safe and Minimally Invasive   |
| F5-5  | <b>Minh Duong Le</b><br>(Vietnam) | Microscope-based Augmented Reality Navigation Spine Surgery for Cervical Spine Diseases   |
| F5-6  | <b>Chi An Luo</b><br>(Taiwan)     | The Safety and Efficiency of Performing Cervical Transforaminal Epidural Steroid Injections: Comparison of Fluoroscopic-guided and Ultrasound-guided Technique    |
| F5-8  | <b>Ta Li Hsu</b><br>(Taiwan)      | Contralateral Inside-Out Biportal Endoscopic Posterior Cervical Foraminotomy: Surgical Techniques and Preliminary Clinical Outcomes                               |
| F5-9  | <b>Chun Tseng</b><br>(Taiwan)     | A Time-saving and Effective Technique Using SURGICEL™ Packing for Controlling Bleeding during Spinal Endoscopy Surgery  |
| F5-10 | <b>Meng Huang Wu</b><br>(Taiwan)  | An Innovative Imaging System for Visual Clarity and Blood Vision Barrier in Spine Endoscopic Surgery  |
| F5-11 | <b>Hiroki Iwai</b><br>(Japan)     | Net Promoter Score in Spine Surgeries   |



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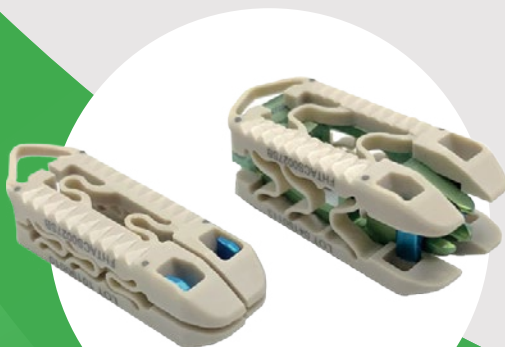


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## Degenerative Spondylolisthesis

7/15 (Sat) 08:00-08:36

### Moderator



**Professor**

**Chien Min Lin** (Taiwan)

TMU, Shuang-Ho Hospital, Neurosurgical Department :  
Attending Physician

TMU, Taipei Neuroscience Institute : Vice Superintendent

TMU, School of medicine: Professor



**Professor**

**Chang Nam Kang** (Korea)

Professor, Dept. of Orthopaedic Surgery, College of Medicine,  
Hanyang University, Seoul, Korea



**Professor**

**Hidetomi Terai** (Japan)

Associate Professor

Dept. of Orthopaedic Surgery

Osaka Metropolitan University Graduate School of Medicine



**Professor**

**Jwo Luen Pao** (Taiwan)

Head, Depart of Orthop. Surg, Far Eastern Memorial Hospital  
(FEMH), New Taipei, Taiwan

Clinical Assistant Professor, Depart. Orthop. Surg, FEMH

Chief, Division of Spine Surgery, Depart. Orthop. Surg, FEMH

## Speaker



### Professor

## Jae Hung Shin (Korea)

- ▶ Director of the Gyeongin Branch, Korean Spinal Surgery Society
- ▶ Formal member of The Korean Orthopedic Association
- ▶ Formal member of Korean Society of Spine Surgery – Department of MIS
- ▶ Kangdong Kyung Hee University Fellow, Spine Center, Professor of Orthopedic Surgery, Kyung Hee Medical Center
- ▶ Hallym University Medical Center Associate Professor of Orthopedic Surgery

## I Prefer Endoscopic Decompression Alone for the Treatment of the 'Sable' Lumbar Degenerative Spondylolistheses

### Purpose

To solve the symptomatic spinal stenosis due to lumbar degenerative spondylolisthesis, the endoscopic decompression alone is a satisfactory treatment for the stable lumbar degenerative spondylosis. But, for the unstable lumbar degenerative spondylolisthesis, or the degeneration accompanying back pain as the main symptom, 'the endoscopic decompression alone' cannot solve the problem. In the unstable spondylolisthesis, the interbody fusion is needed, either through the endoscopic or the conventional fusion.

### Materials and Methods

I will present the classification of the lumbar degenerative spondylolisthesis, and the comparison of the outcome of the surgical treatments for it with citing the previously published literatures. And, I will show some cases of 'the endoscopic decompression alone' group and 'interbody fusion' group, sorted according to the existence of the instability.

### Conclusion



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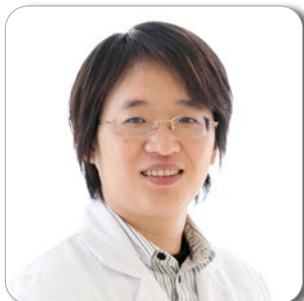
**1F Ball Room B**

**7/15 (Sat) 08:00-08:10**

For the symptomatic spinal stenosis due to the degenerative lumbar spondylolisthesis, various treatments are feasible. As surgical treatments, 'the endoscopic decompression alone' and 'additional interbody fusion' can be applied. For the stable degenerative spondylolisthesis, 'the endoscopic decompression alone' can relieve the symptoms and prevent the aggravation of listhesis. But for the unstable lumbar degenerative spondylolisthesis, or the degeneration accompanying back pain, 'the endoscopic decompression alone' can cause the aggravation of instability or worsen the symptoms including back pain, and the additional interbody fusion is need later. So, to check the preoperative radiologic images circumspectly and take the patients' main symptoms carefully is very significant to choose the surgical option for the lumbar degenerative spondylolisthesis.



Speaker



Professor

**Chang Jung Chiang** (Taiwan)

- ▶ Chief, Department of Orthopedic Surgery, Taipei Medical University -Shuang Ho Hospital.
- ▶ Associate Professor, School of Medicine, Taipei Medical University.

## Minimally Invasive Spine Surgery Using Multiple Screws in One Hole (Msioh) Technique

-10-year Experience in Shuang Ho Hospital -  
Chiang Chang-Jung, MD, PhD.  
Associate Professor,  
Chief of Dpt. of Orthopedic Surgery  
Shuang-Ho Hospital, Taipei Medical University

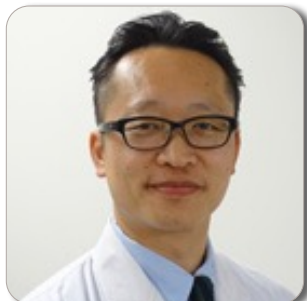
Decompression and instrumented spine fusion are usually required when treating degenerative lumbar disorders. In managing advanced spondylosis or multilevel cases, these procedures have traditionally been associated with high risk of complications, due to long operative times and high blood loss. Minimal invasive spine (MIS) surgery, as a keyhole surgery, can reducing soft tissue and muscle damage, decreasing blood loss and speeding patient's recovery. However, easy disorientation in advanced structure deformity, inadequate decompression and high radiation exposure during surgery are main concerns for MIS surgery.

In our department, we performed MIS-TLIF method to manage symptomatic patients with multi-level stenosis, spondylolisthesis or deformity. Single-dimensional fluoroscopy technique combined multiple screws in one hole (Msioh) technique is used during instrumentation. It can save the time in performing pedicle screw implantation and less the radiation exposure during the procedure. Our case series showed that perioperative morbidity could be minimized through the use of MIS-TLIF technique, as demonstrated by the minimal blood loss, short hospitalization and low infection rate.





Speaker



**Professor**  
**Seiji Yamaya** (Japan)

- ▶ Director of the Center of Endoscopic Spine Surgery, Orthopedic Surgery, Sendai Nishitaga Hospital
- ▶ PhD degree, Department of Orthopedic Surgery, Tohoku University.
- ▶ Board-Certified Endoscopic Spine Surgeon MED
- ▶ Board-Certified Endoscopic Spine Surgeon FESS

## Full-endoscopic Klif for Lumbar Spondylolisthesis and Local Scoliosis

Seiji Yamaya<sup>1,2</sup>, Ko Hashimoto<sup>3</sup>, Yutaka Koizumi<sup>2</sup>, Yutaka Yabe<sup>2</sup>, Hideaki Suda<sup>2</sup>, Chikashi Kawahara<sup>2</sup>, Naoki Morozumi<sup>2</sup>, Shoichi Kokubun<sup>2</sup>, Toshimi Aizawa<sup>3</sup>

<sup>1</sup>Center of Endoscopic Spine Surgery, Department of Orthopedic Surgery, Sendai Nishitaga Hospital,

<sup>2</sup>Department of Orthopedic Surgery, Sendai Nishitaga Hospital,

<sup>3</sup> Department of Orthopedic Surgery, Tohoku University School of Medicine

### Background

Full-endoscopic trans-Kambin lumbar interbody fusion (KLIF) was reported in Japan in 2018. There were few reports about KLIF. It consists of surgical procedures with posterior percutaneous pedicle screw fixation and full-endoscopic interbody fusion using a tran-Kambin approach. It was developed for treating degenerative lumbar spondylolisthesis. KLIF can perform indirect decompression like XLIF and OLIF. XLIF and OLIF had some reports about serious complications such as intestinal and major vascular injuries. Such complications are less likely to occur in KLIF due to different approaches. However, KLIF needs peculiar attention to avoid exiting nerve root injury (ENRI) because the surgical technique is based on transforaminal full-endoscopic spine surgery (FESS). I started to perform KLIF in 2018. I extended KLIF indications from lumbar spondylolisthesis to lumbar spondylolisthesis with degenerative local scoliosis.

### Objectives

We studied the clinical outcomes, complications, and intervertebral fusion rates of the 43 patients having lumbar spondylolisthesis with and without local scoliosis treated by KLIF with the follow-up period > 1 year.



## Methods

A single surgeon performed KLIF for all 43 cases from November 2018 to 2022. All cases used iliac bone for the bone graft. The mean follow-up period after KLIF is 2.5 years. The clinical outcomes (JOA score, JOABPEQ, Visual analog scale of low back pain and lower extremity pain) and complications were prospectively evaluated at 1, 3, 6, and 12 months postoperatively. The degree of slippage (% slip) was measured on an X-ray before and one year after surgery. The intervertebral fusion rate was evaluated using CT one year after surgery. Eleven cases had degenerative lumbar spondylolisthesis with local scoliosis. The subsidence rate was compared between cases in which the cage was inserted from the concave side and from the convex side in local scoliosis cases.

## Results

All of the clinical outcomes significantly improved at one month postoperatively compared to those preoperatively. There were no serious complications. A transient symptom of exiting nerve root occurred in one case, which improved after one month. The degree of slippage (% slip) improved significantly from 22% before surgery to 8% after surgery, and the interbody bone fusion rate was 93% at one year postoperatively. Three patients underwent reoperation due to nonunion or subduction of the cage. The five cases with the insertion of a cage on the concave side had no subsidence, whereas two out of six cases with the insertion of a cage on the convex side had subsidence. The subsidence rate of the group of insertion on the convex side was higher than on the concave side.

## Conclusions

KLIF was an excellent minimally invasive procedure with good clinical results, reduction, high interbody fusion rate (93%), and no serious complications for lumbar spondylolisthesis. The insertion of a cage on the concave side may be more reliable than on the convex side to reduce local scoliosis.

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## Concepts and Pitfalls for Endoscopic Spine Surgery-A

Moderator



**Professor**

**Zenya Ito** (Japan)

Chair of Aichi Spine Hospital

Assistant Professor in Nagoya University Hospital

Vice President of Aichi Spine Institute



**Professor**

**Chien Min Chen** (Taiwan)

Division of Neurosurgery, Department of Surgery, Changhua Christian Hospital, Changhua.

Director of Minimally Invasive Spine Center, Changhua Christian Hospital. Board of Surgery, Taiwan Surgical Association.

Speaker



**Professor**  
**Kiyoshi Yagi** (Japan)

- ▶ Department of Orthopaedic Surgery, Graduate School of Medical Sciences, Nagoya City University Hospital
- ▶ Japan Orthopedic Society – Member
- ▶ The Japanese Society for Spine Surgery and Related Research – Member

## How to Perform Local Anesthesia for Endoscopic Spine Surgery

The greatest advantage of transforaminal full-endoscopic spine surgery(TF-FES) is that it can be performed under local anesthesia. The patient would be in awake and aware condition; thus, exiting nerve root injury can be avoided. Furthermore, the elderly patients with poor general condition can undergone surgery.

We always perform discography before surgery to confirm the approach to Kambin's triangle is possible and surgery under local anesthesia is possible.

Patients who can not to be prone position due to severe pain or who moves unexpectedly even under subcutaneous anesthesia are excluded.

We use 1% lidocaine for local anesthesia. Firstly, we inject 10 ml into subcutaneous and intramuscular with a 23G needle. Then, we inject 1-2 ml each into the superior articular process, pedicle, and endplate of the caudal vertebral body with 18G needle. Finally, inject 2 ml each into the annulus fibrosus and disc space.

This method usually allows surgery without pain. However, since nerve roots are not anesthetized, nerve root stimulation symptom can be monitored. Furthermore, patients with low disc height may feel temporary low back pain when inserting the cannula into the disc. Therefore, it is important to inject sufficiently the annulus fibrosus and the intervertebral disc.

We describe the advantages and pitfalls of TF-FES under local anesthesia.

Speaker



Professor

**Kazuya Kishima** (Japan)

- ▶ Dept. of Orthopaedic Surgery, Hyogo College of Medicine, Hyogo, Japan
- ▶ Dept. of Orthopedic Surgery, Tokushima university, Tokushima, Japan
- ▶ Dept. of Orthopaedic Surgery, Hyogo College of Medicine, Hyogo, Japan
- ▶ Faculty of medicine, Hyogo college of medicine, Hyogo, Japan
- ▶ PhD, Graduate School of Medicine, Hyogo college of Medicine, Hyogo, Japan

## How to Perform Transforaminal Full-Endoscopic Ventral Facetectomy under Local Anesthesia

Kazuya Kishima

Department of orthopaedic surgery, Hyogo medical university

### Introduction

Full-endoscopic spine surgery (FESS) using the transforaminal (TF) approach is a minimally invasive spine surgery that can be performed through an 8mm incision under local anesthesia. FESS was originally developed as a discectomy for lumbar disc herniation, but with recent improvements in surgical techniques and advances in surgical equipment such as high-speed drills, the indication has been expanded to lumbar spinal canal stenosis. In 1996, Kambim et al. first introduced full-endoscopic spinal decompression using the TF approach for lateral recess stenosis. And transforaminal full- endoscopic ventral facetectomy (TF-FEVF) was also a surgical technique for lateral recess stenosis.

### Surgical Procedure of TF-FEVF

All patients undergo preoperative discography as a preoperative planning to confirm that the disc can be approached safely. CT imaging is performed after discography.

All cases are performed under local anesthesia to prevent nerve root injury (ENI) caused by intraoperative manipulation. When puncturing the disc using TF approach, we try to enter the disc by rubbing the outside of the superior articular process (SAP). This makes it easier to orientate the canula when placing it.



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After local anesthesia, surgical technique requires 5 steps.

1. Canula was placed on the outside of the disc.
2. Total resection of SAP using high speed drill.
3. Partial resection of ventral inferior articular process (IAP) using high speed drill.
4. Remove the ligament flavum on the traversing nerve.
5. Confirm the traversing nerve was decompressed.

After surgery, patients were out of bed and walking within two hours.

With the accumulation of cases, we now know the clinical outcomes and the preoperative predictors of poor outcomes of TF-FEVF.

In my presentation, I will also discuss the surgical indications for TF-FEVF in addition to the surgical technique.

Speaker



Professor

**Tawechai Tejapongvorachai** (Thailand)

- ▶ Professor Emeritus Tawechai Tejapongvorachai. MD, MSc.
- ▶ Department of Orthopaedic Surgery Chulalongkorn Hospital, Chulalongkorn University

Present status :

- ▶ Attending Staff in the Department of Orthopaedic Surgery, Chulalongkorn Hospital Since 1993 to Present

## Concepts and Pitfalls of Endoscopic Lumbar Discectomy

The concepts of the two main approaches to endoscopic lumbar discectomy, transforaminal and interlaminar, are well established. With the increasing use of endoscopic techniques in spinal procedures, the associated complications are emerging as important problems. These include postoperative inadequate discectomy, dural tear, dysesthesias, hematomas, infections, etc. There are several technical guidelines to increase the effectiveness of endoscopic techniques and avoid complications.





## Degenerative Scoliosis

7/15 (Sat) 08:36-09:24

### Moderator



**Professor**

**Koichi Sairyo** (Japan)

Professor and Chairman, Department of Orthopedics,  
Tokushima University  
Society Chairman, Japan Society of Minimally Invasive Spine  
Surgery



**Professor**

**Seok Woo Kim** (Korea)

Associate editor in "The Spine Journal", Official Journal of  
NASS (North American Spine Surgery),  
Deputy Editor in JASS (Journal of Advanced Spine Surgery),  
Advisory editor in "The Journal of Korean Society of Spine  
Surgery"



**Professor**

**Gabriel Liu** (Singapore)

Associate Professor Department of Orthopaedic Surgery Yong  
Loo Lin School of Medicine National University of Singapore  
Head & Senior Consultant University Spine Centre Depart-  
ment of Orthopaedic Surgery, National University Hospital  
Core Faculty NUHS Residency Programme Department of Or-  
thopaedic Surgery, National University Hospital



**Professor**

**Yi Hung Huang** (Taiwan)

Chief of MISS Center (Center Of Minimally Invasive Spine Surgery)  
Chia Yi Christian Hospital -Assistant Professor

Speaker



Professor

**Kuniyoshi Tsuchiya** (Japan)

- ▶ Director, Department of Orthopaedic Surgery and Chief Spine Surgeon JCHO Kyushu Hospital Minimally Invasive Spine Surgery
- ▶ Kyushu University, school of medicine (M.D.)
- ▶ Graduate school of medicine, Kyushu University (Ph.D.)

## I Prefer Endoscopic Decompression Alone

Problems lie in degenerative lumbar scoliosis (DLS) are classified into three categories, sagittal and coronal off-balance, back symptoms caused by instability, and pure neurologic symptoms. Some of neurologic symptoms are dynamic due to instability and some are static. Thus pain generator and cause of disturbance should be strictly clarified and treatment strategy should be determined based on their mechanical basis.

Patients frequently complaint only leg pain, without any low back pain even in the cases of DLS. In those, decompression surgery will be of choice.

What makes decompression surgery for DLS more difficult? They are participation of instability and more complex form of nerve compression. In the cases of DLS, those compression factors are even duplicated or triplicated, making sufficient neural tissue decompression and preservation of supportive tissue more complicated.

In order to manage those circumstances, full endoscopic surgery is a matter of choice. Nerve compression often occurs on the concave side. When nerve compression had been occurred on the concave side, facet preservation is the key and it is often difficult because interlaminar space is generally narrow at concave side. Facet joints on the concave side tend to be sclerotic and hypertrophic because of mechanical stress, thus make decompression procedure more difficult.



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When foraminal stenosis is combined with the central one, fusion surgery has been the gold standard for a long time because it was difficult to decompress intracanal and foraminal lesion at the same time without sacrificing facet joint on the concave side, which will be more important than those on convex side. As an alternative choice, foramen can be decompressed from contralateral side in combination with central canal decompression (Contralateral Decompression of Foramen from Inside of the Canal, CDFIC).

Decompression has advantage to preserve motion segments and for less surgical invasion. However, fixed coronal deformity and off-balance cannot be resolved only with decompression surgery. Surgeons should be aware of those and perform surgery under enough consideration of biomechanics, both in static and dynamic standpoint. Nevertheless full-endoscopic spine surgery will give patients substantial benefits with an evolved technique and under thoughtful indication.



Speaker



**Professor**

**Seok Bong Jung** (Korea)

- ▶ Director of Spine Center, Jinju Bon Hospital, in South Korea
- ▶ Member of Korea society of MISS, KOSASS
- ▶ Board Member in South Korea of PASMISS

## Interbody Fusion in Degenerative Lumbar Scoliosis Under Biportal Endoscopic Surgery

Seok-Bong Jung  
Spine center, Jinju Bon Hospital, Jinju-si, Gyeongsangnam-do, South Korea

### Back grounds and Introduction

De novo degenerative lumbar stenosis has become one of the topics of spinal disorders.

It causes significant pain and disability in the elderly. With the aging of the population, the incidence of adult degenerative lumbar scoliosis will continue to increase.

DLS can be treated by decompression alone, decompression with short segment fusion, and decompression with long segment fusion. Biportal endoscopic interbody fusion surgery can be performed in decompression with short segment fusion.

### Main body .

There is increasing evidence of benefits in endoscopic spine surgery in the treatment of degenerative spine conditions. Therapeutic indications of endoscopic spinal surgery have expanded from disk herniation requiring discectomy to bilateral and contralateral stenosis decompression and fusion.

Biportal endoscopic transforaminal lumbar interbody fusion (TLIF) may have advantages of minimally invasive fusion surgery as well as those of endoscopic surgery. In particular, there is no need of blood transfusions and little infection. Basically, the



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biportal endoscopic TLIF technique is similar to minimally invasive TLIF with a tubular retractor.

A 30 degrees arthroscope is used and a osteotome and chisel is used to harvest a lot of autogenous local bone without using a burr.

There were 2 steps in the biportal endoscopic TLIF procedures. The first was the insertion of a cage under the endoscopic view and the second was percutaneous pedicles screw fixation. Usually the scoliotic angle is corrected by inserting a cage in concave side initially and screw and rod fixation finally.

### **Conclusions**

Biportal endoscopic lumbar interbody fusion is a safe and effective procedure in mild to moderate DLS with good early clinical results and improvement in coronal Cobb angle. It can be considered as an option if a short segment(s) fusion is planned for adult DLS.

**Keywords:** Biportal endoscopic surgery, Fusion; Lumbar degenerative scoliosis; Minimally invasive surgery.

Speaker



Professor

**Chang Chen Yang** (Taiwan)

- ▶ Attending Orthopedic Surgeon of Orthopedic Department, Dalin Tzu-Chi General Hospital, Taiwan
- ▶ Director of Orthopedic Department, Dalin Tzu-Chi General Hospital, Taiwan

### I Prefer Biportal Endo-fusion

Interbody fusion is considered the gold standard treatment for patients with spondylolisthesis. Various minimally invasive lumbar interbody fusion procedures, such as uniportal, biportal, or microscopic tubular (MT) techniques, have been introduced. All of these methods have been proven effective in treating the condition and have demonstrated less soft tissue trauma compared to traditional TLIF.

Both uniportal and biportal endo-fusion techniques offer advantages in terms of better endplate visualization, endplate preparation, and potentially better fusion bed compared to the MT method. The soft tissue trauma associated with biportal endo-fusion may be similar to that of uniportal endo-fusion, resulting in a smaller incision and faster recovery.

However, the learning curve for biportal endo-fusion is less steep compared to uniportal endo-fusion and may also involve less radiation exposure.

Personally, I prefer the biportal endo-fusion technique because it combines the advantages of minimally invasive TLIF and endoscopic spine approaches.

Speaker



**Professor**  
**Shiau Tzu Tzeng** (Taiwan)

- ▶ Attending Surgeon, Department of Orthopedics, Taipei Tzu Chi Hospital, Xindian, New Taipei City, Taiwan

## I Don't Prefer Endoscopic Surgery

Degenerative scoliosis poses significant challenges for patients and healthcare providers alike. While endoscopic surgery has gained popularity as a minimally invasive treatment option, this talk presents an alternative viewpoint by examining the limitations and potential drawbacks of endoscopic surgery in the context of degenerative scoliosis.

The efficacy and outcomes of endoscopic surgery compared to traditional open surgical approaches for degenerative scoliosis are evaluated. Through a comprehensive review of the existing literature and clinical studies, the limitations of endoscopic surgery are highlighted, including its restricted visualization and limited access to complex spinal anatomy.

Additionally, the potential risks associated with endoscopic surgery include inadequate decompression, incomplete correction, and increased revision rates. These concerns are particularly relevant in the context of degenerative scoliosis, where the multifactorial nature of the condition requires comprehensive surgical intervention to achieve optimal outcomes.

The findings of recent literature review suggest that alternative surgical techniques, such as open surgical approaches, may provide more favorable outcomes for patients with degenerative scoliosis. The advantages of open surgery, such as improved visualization, enhanced spinal correction, and the ability to address complex deformities, outweigh the potential advantages of endoscopic surgery.

In conclusion, we challenge the prevailing preference for endoscopic surgery in the treatment of degenerative scoliosis. By shedding light on the limitations and potential risks associated with this approach, it encourages further research and discussion among healthcare professionals to ensure the best possible surgical outcomes for patients with degenerative scoliosis.

## Note

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## Concepts and Pitfalls for Endoscopic Spine Surgery-B

7/15 (Sat) 08:36-09:24

### Moderator



**Professor**

**Warat Tassanawipas** (Thailand)

Phramongkutklao Army Hospital Department of Orthopaedics



**Professor**

**Meng Huang Wu** (Taiwan)

Taiwan Society of Minimally Invasive Spine Surgery, Board Director  
Taiwan Medical Design Association, Board Director, Vice Director,  
International Affairs and Academic Committee  
Taiwan Society of Endoscopic Spine Surgery, Executive Board  
Director



**Professor**

**Mathan Sakti Yudha** (Indonesia)

Professor of Medicine and Health Sciences,  
Faculty of Medicine, Public Health, and Nursing,  
Gadjah Mada University, Yogyakarta Deputy Secretary General of  
The Indonesian College of Orthopaedic and Traumatology  
Chairman of the Fellowship Education Commission of The Indone-  
sian College of Orthopaedic and Traumatology



## Speaker



## Professor

**Agung Irianto Komang** (Indonesia)

- ▶ Associate Professor in Orthopaedic Department, Airlangga University, Surabaya, Indonesia.

## Concepts and Pitfalls of Endoscopic Surgery For Lumbar Stenosis

Komang Agung Irianto  
Surabaya Orthopedic & Traumatology Hospital

In the past decades, endoscopic spine surgery has bloomed and blossomed and become the treatment of choice in today's spinal surgery especially for degenerative spine diseases. Small incision on skin and fascia, less soft tissue dissection, and the vision directly to the tissue involved are among the advantages. Endoscopic is the matter of optic, fine instrumentation, strict indication, and exact approach to find the source of the pain. The overall concepts are knowing where you are, where are you going, and how are you going to undertake the target. Surgeon needs to understand the benefits and the limitation of the techniques (percutaneous, uniportal, biportal) and the approaches (transforaminal, interlaminar, paraspinal).

The presentation will particularly emphasize on the key concepts of the different techniques, docking the endoscope by careful preoperative radiologic evaluation for the precise angle approach, the cutting-edge instruments, the limitations, and the future challenges of it.



July 13 (Thu) - July 15 (Sat) 📍 Tainan, Taiwan  
Formosa Hotel - International Banquet Hall.

1F Ball Room C

7/15 (Sat) 08:46-08:56

## Speaker



**Professor**

**Hyeun Sung Harrison Kim** (Korea)

- ▶ Neurosurgery Specialist / Hospital Director of the Harrison Spinartus Hospital Chungdam
- ▶ Editor-in-Chief of JMISSST
- ▶ Section Editor of World Neurosurgery
- ▶ Chair of 2019 NASS/Neurospine Endoscopic Spinal Surgery (ESS) Symposium and Cadaver Workshop

## Concepts and Pitfalls of Endoscopic Interbody Fusion

## Speaker

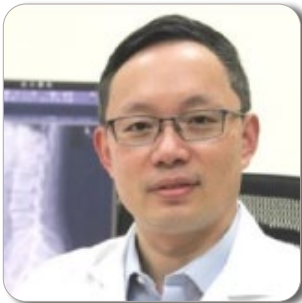
**Professor**  
**Zhi Kang Yao** (Taiwan)

- ▶ Attending Orthopaedic surgeon, Department of Orthopaedics, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan.
- ▶ Attending Orthopaedic surgeon, Department of Surgery, Chaiyi branch Taichung Veterans General Hospital, Chaiyi, Taiwan
- ▶ Attending Orthopaedic surgeon, Department of Orthopaedics, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan.

**Concepts and Pitfalls of Biportal Endoscopic Interbody Fusion**

The biportal endoscopic spine surgery is a revolutionary minimally invasive technique and has become increasingly popular recently. Unlike uniportal endoscopic techniques, the endoscope and surgical instruments can be handled independently through 2 independent portals with continuous irrigation of normal saline. The technique has been applied to various minimally invasive spine procedures, including discectomy and decompression. Recently, the biportal endoscopy interbody fusion technique was developed. A comprehensive literature search was performed. The currently published papers about biportal endoscopic interbody fusion were reviewed. Most published papers show significant improvement in clinical scores, such as VAS, ODI, and JOA scores. Besides, the biportal endoscopic fusion technique was associated with shorter hospital stays and better short-term VAS scores for back pain. Although there are various advantages, longer operation time and a steep learning curve are the potential drawbacks. The fusion rate still needs more evidence and discussion. It is essential to perform surgery safely and avoid complications. This talk will discuss the concepts and pitfalls associated with biportal endoscopic interbody fusion.

Speaker



**Professor**  
**Cheng Li Lin** (Taiwan)

- ▶ Director of Spine Division Department of Orthopedic Surgery National Cheng Kung University Hospital, Tainan, Taiwan
- ▶ Secretary General Taiwan Society of Endoscopic Spine Surgery 2023
- ▶ Secretary General Pacific and Asian Society of Minimally Invasive Spine Surgery 2023

## Complications of Spine Endoscopic Surgery

With the advancements in endoscopic lumbar surgery techniques, the realm of treatment for lumbar degenerative diseases, including lumbar spinal stenosis, foraminal stenosis, and lumbar disc herniation, has expanded significantly. However, it is imperative to acknowledge that various studies have extensively examined the complications associated with full endoscopic lumbar surgery. These complications encompass a range of issues, such as dura tear, epidural hematoma, motor weakness, cauda equina syndrome, wound infection, and many others. In this talk, a comprehensive review of these potential complications and their corresponding management strategies will be presented.

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## TSESS Opening Remark



**Professor**

**Yi Hung Huang** (Taiwan)

Chief of MISS Center (Center Of Minimally Invasive Spine Surgery)  
Chia Yi Christian Hospital -Assistant Professor



**Professor**

**Chien Min Chen** (Taiwan)

Division of Neurosurgery, Department of Surgery, Changhua  
Christian Hospital, Changhua.  
Director of Minimally Invasive Spine Center, Changhua Christian  
Hospital. Board of Surgery, Taiwan Surgical Association.



**Professor**

**Jwo Luen Pao** (Taiwan)

Head, Depart of Orthop. Surg, Far Eastern Memorial Hospital  
(FEMH), New Taipei, Taiwan  
Clinical Assistant Professor, Depart. Orthop. Surg, FEMH  
Chief, Division of Spine Surgery, Depart. Orthop. Surg, FEMH



**Professor**

**Chung Chyi Shen** (Taiwan)

Chief of the Neurological Institute and Head of Department of  
Neurosurgery at TCVGH in Taichung, Taiwan.  
Member and President of Taiwan Society for Neurovascular and  
Interventional Surgery  
Member and President of Taiwan Pituitary Society



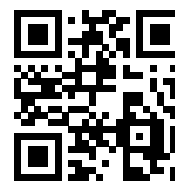
**Professor**

**Keng Chang Liu** (Taiwan)

Director, Division of Spine Surgery, Department of Orthopedics,  
Buddhist Dalin Tzu Chi Hospital, Taiwan  
President, PASMIS & TSESS, 2023

## Free Papers 6

### Moderator



SCAN ME



**Professor**

**Tsung Ting Tsai** (Taiwan)

Professor of Chang Gung University  
Director of Bone and Joint Research Center, Chang Gung Memorial Hospital  
Director of Taiwan Spine Society



**Professor**

**Kuo Yuan Huang** (Taiwan)

Associate Professor, Department of Orthopedics, College of Medicine, National Cheng Kung University Hospital, Tainan City, Taiwan  
Board Member of Pacific and Asian Society of Minimally Invasive Spine Surgery  
BMC Musculoskeletal Disorders - BMC Journal Editorial Board Member



**Professor**

**Po Hsin Chou** (Taiwan)

Taipei Veterans General Hospital



**Professor**

**Cheng Huan Peng** (Taiwan)

Deputy Director of the Orthopedics Department at Hualien Tzu Chi Hospital.  
Attending Physician in the Orthopedics Department at Hualien Tzu Chi Hospital.





**Speaker**

F6-1	<b>Nan Fu Chen</b> (Taiwan)	Fully Endoscopic Lumbar Discectomy for Highly Upward Migrated Disk Herniation: Experience Sharing and Early Surgical Outcome
F6-2	<b>Zhi Kang Yao</b> (Taiwan)	Learning the Lessons from the Complications Related to Biportal Endoscopic Discectomy
F6-3	<b>Chung Chia Huang</b> (Taiwan)	Unilateral Biportal Endoscopic Discectomy via Translaminar Approach for Distant Upward Migrated Lumbar Disc Herniation: Technical Note and Preliminary Report
F6-4	<b>Saori Soeda</b> (Japan)	Clinical and Radiographic Evaluation of Full-Endoscopic Trans-Kambin's Triangle Lumbar Interbody Fusion for Degenerative Spondylolisthesis
F6-5	<b>Kuo Pin Kuo</b> (Taiwan)	Analysis of Outcome and Pitfalls in Biportal Endoscopic Spine Surgery (BESS) Trans-Kambin Fusion (KLIF) Procedure
F6-6	<b>Kosuke Sugiura</b> (Japan)	Short-term Outcomes of Full-Endoscopic Disc Cleaning Surgery for Intractable Low Back Pain due to Modic Type 1 Change
F6-7	<b>Yudha Mathan Sakti</b> (Indonesia)	Evaluation of Guide-Needle Angle and Sleeve Placement Based on Skin Entry Point in Lumbar IV-V PELD Procedure Based on 3D CT-Scan in Indonesian Population
F6-8	<b>Juan Amaya</b> (Colombia)	Evaluation of Clinical Outcomes in Lumbar Spine Decompression Performed via Unilateral Biportal Endoscopy (UBE) in a Six Months Period. Retrospective Case Series.
F6-9	<b>Wen Shuo Chang</b> (Taiwan)	Exploring Physical Lumbar Microvascular Geometry through Endoscopy and Illustrations: Implications for Clinical Interpretation
F6-10	<b>Kuo Pin Kuo</b> (Taiwan)	The Impact of Covid -19 on the Development of Biportal Endoscopic Spine Surgery Experience in the County Hospital Setting from Taiwan.
F6-11	<b>Pang Hsuan Hsiao</b> (Taiwan)	Computed Tomography-guided Endoscopic Surgery in Lumbar Disc Herniation With High-grade Migration
F6-12	<b>Chang Nam Kang</b> (Korea)	Efficacy and Safety of Escherichia coli-derived Recombinant Human Bone Morphogenetic Protein-2 in Additional Lumbar Posterolateral Fusion: Minimum 1-year Follow-up
F6-13	<b>Ching Hsiao Yu</b> (Taiwan)	Biportal Endoscopic Lumbar Interbody Fusion (BELIF) with Percutaneous Screws Instrumentation. A Cases Series and Technical Note
F6-14	<b>Yudha Mathan Sakti</b> (Indonesia)	Transforaminal Endoscopic Lumbar Discectomy for L5-S1 Disc Herniation: A Case Series

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## Advancement of Endoscopic Surgery

### Moderator



**Professor**

**Wen Chien Chen** (Taiwan)

Director of the Orthopedics Department at New Taipei City Hospital - Tucheng Branch.

Attending Physician in the Orthopedics Department at Chang Gung Memorial Hospital - Taoyuan Branch.



**Professor**

**Hung Kang Wu** (Taiwan)

Orthopaedic specialist, Department of Orthopaedic Surgery, Taoyuan General Hospital (TYGH), Taoyuan, Taiwan

Chief, Emergency Room of Sinwu Branch, TYGH

Chief, Orthopaedic Department of Sinwu Branch, TYGH



**Professor**

**Chien Chun Chang** (Taiwan)

Director, Minimally Invasive Spine and Joint Center, Tzu-Chi hospital, Taichung, Taiwan

Assistant professor, National Chin-Yin University of Technology



**Professor**

**Se Yi Chen** (Taiwan)

Attending Physician in the Neurosurgery Department at Taichung Veterans General Hospital.

Attending Physician in the Neurosurgery Department at Taichung Veterans General Hospital - Puli Branch.



**Professor**

**Shang Wen Feng** (Taiwan)

Director of the Minimally Invasive Spinal Joint Surgery Center at National Yang-Ming Chiao Tung University Hospital.

Attending Physician in the Orthopedics Department at National Yang-Ming Chiao Tung University Hospital.

Speaker



**Chao Jui Chang** (Taiwan)

- ▶ Attending Professor, Department of Orthopaedic Surgery, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Dou-Liou Branch, Douliu, Taiwan
- ▶ Member, Taiwan Orthopaedic Trauma Association
- ▶ Member, Taiwan Society Of Endoscopic Spine Surgery

**Full Endoscopic Spine Surgery for Cervical Spondylotic Myelopathy: A Systematic Review**

Purpose :

Cervical spondylotic myelopathy (CSM) typically presents with neck and shoulder pain, loss of hand dexterity, gait disturbance, motor weakness of limbs, bowel or bladder dysfunction, and even paralysis, which seriously affect the quality of life. In the current literature, there was scarce evidence to prove the pros and cons of full endoscopic spine surgery in the treatment of CSM. The purpose of this study was to conduct a systematic review to elucidate the efficacy of full endoscopic spine surgery in the management of CSM patients.

Materials and Methods :

This systematic review was conducted in accordance with the PRISMA guidelines. A systematic search of the Web of Science, PubMed MEDLINE, Embase, and Cochrane Library was conducted from database inception to February 1, 2023.

Results :

The study included 183 patients and the age ranged from 37 to 70.2 years (56.78 ± 7.87 years). The average surgical time was from 56.6 to 169.3 min (96.34 ± 33.58 min). Intra-operative blood loss ranged from minimal amount to 51 ml. Average length of hospital stay was from 0.7 to 5.75 days (3.56 ± 1.6 days). The average follow-up duration was 18.7 ± 6.76 months (11.3 -29 month ). Anterior transcorporeal decompression was described by two studies to treat single-segment lesion. One study used posterior biportal endoscopic decompression to solve two-segment OPLL, while other 9 included studies adopted posterior approach with single portal endoscopic



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cervical decompression. Significant improvements were noted in all aspects of functional outcomes and image results after the full endoscopic cervical spine surgery, with no major complications.

Conclusion :

The current study found that both anterior transcorporeal and posterior surgical approaches could be used for the treatment of CSM with full endoscopic technique. Indications of full endoscopic cervical spine surgery for CSM ranged from cervical disc herniation, central canal stenosis to calcified ligamentum flavum and OPLL. Improved postoperative outcomes with acceptable surgical complications were noted in this systematic review.

Speaker



**Professor**  
**Zenya Ito** (Japan)

- ▶ Chair of Aichi Spine Hospital
- ▶ Assistant professor in Nagoya University Hospital
- ▶ Vice president of Aichi Spine Institute

## Comparison of Unilateral Laminectomy for Bilateral Decompression by Four Surgical Methods

### Introduction

The unilateral laminectomy for bilateral decompression (ULBD) method for lumbar spinal stenosis has been performed in the order of Microendoscopic laminectomy (MEL), Percutaneous Endoscopic Laminectomy (PFEL), Percutaneous Stenoscopic Lumbar Decompression (PSLD), and Unilateral Biportal Endoscopic Laminectomy (UBEL).

This time, I would like to compare the advantages and disadvantages of four ULBD methods and find useful points for spinal surgery including ULBD in the future.

### Methods

ULBD by four surgeries shares the same basic operation step by step. After skin incision, clearance of soft tissue, partial resection of the inferior edge of the cranial lamina and liberation of the ligamentum flavum, next them of the caudal lamina, partial resection them from the contralateral and ipsilateral laminae are performed.

139 cases of MEL, 85 PFEL, 91 PSLD and 42 UBEL were operated on.

The operation time, VAS (back & buttock pain, lower leg pain & numbness at preoperative, 1 month later, 3m, 6m and 1 year later), ODI, Macnab's criteria, postoperative bleeding, postoperative hematoma, and dura mater damages were compared. Fatty degeneration of multifidus muscle by Goutallier classification, bone resection area in 3-dimensional computed tomography (3DCT), and advanced side cut angle at L3/4 were analyzed.



## Results

The operation time was shorter in the order of MEL, UBEL, PSLD and PFEL, and there was a significant difference between them.

Compared with preoperatively, VAS, ODI, EQ-5D and Macnab's criteria were significantly improved at each measurement time by all four surgical methods. However, there was no significant difference between them.

There were no significant difference in muscle damage between three endoscopic laminectomies, but MEL had significantly more muscle damage than the others.

Endoscopic laminectomies had significantly larger advanced side cut angles than MEL. Moreover, UBEL resulted in significantly more outward cuts than the other two endoscopic laminectomies, which was ideal.

The bone resection area in 3-dimensional computed tomography (3DCT) was measured at L3/4 for each case (the DICOM viewer). UBEL produced significantly smaller areas than MEL.

## Conclusions

The advantages of MEL is short operation time and allows for manipulation with both hands. Numerous types of tools are available, and also provide a wide field of view when suture of dural injury is needed. However, due to the prolonged retraction of muscle with the outer sheath, the postoperative fatty changes in the multifidus muscle is somewhat increased. Postoperative bleeding is also slightly higher and the area of bone resection is larger.

PFEL, PSLD, and UBEL are performed under continuous water irrigation, these methods provide clean fine views in high magnification, and allow for fine hemostasis. Therefore, the amount of postoperative blood loss and the risk of hematoma removal are low. These are also suitable for super obese patients due to the increased working lengths of the endoscopes and instruments. The greatest advantages of UBEL are its free selection of available tools, no restriction on the outer sheath, and its efficient osteotomy on the approach side to form a trumpet bell-like shape.

In any of the methods, the surgeon should avoid mistakes as much as possible, become skillful, and switch to a different method with a wider field of view in the case of a problem.

Speaker



**Professor**

**Koichiro Ono** (Japan)

- ▶ Assistant Professor, Department of Orthopedic Surgery  
Nippon Medical School
- ▶ 2017 30th JESS Surgical Forum Award
- ▶ 2019 22th JASMISS English Presentation Award
- ▶ 2021 11th MIST Session Award

## Percutaneous Endoscopic Transforaminal Lumbar Interbody Fusion (PETLIF) for Lumbar Degenerative Disease

Full endoscopic techniques are becoming more popular for degenerative lumbar pathologies. Percutaneous endoscopic lumbar interbody fusion (PETLIF) is a minimally invasive surgical technique for spondylolisthesis and lumbar spinal canal stenosis with instability. Nagahama first introduced PETLIF in 2019. This study investigated the clinical outcomes and complications of 24 patients who underwent PETLIF in our facility and compared them with previous studies. Literature searches were conducted on PubMed and Web of Science. The PETLIF surgical technique involves three steps to acquire disc height under general anesthesia. The procedure includes bone harvesting, spondylolisthesis reduction, endoscopic foraminoplasty, disc height expansion using an oval dilator, and intervertebral disc curettage. A cage filled with autologous bone is inserted into the disc space and secured with posterior fixation. Patients underwent PETLIF with an average operation time of 130.8 minutes and a blood loss of 24.0 ml.

Postoperative hospital stays were 9.5 days. Improvement in VAS, disc height, spinal canal area, and %Slip was observed, while lumbar lordosis remained unchanged. Complications included end plate injury, subsidence, and exiting nerve root injury.





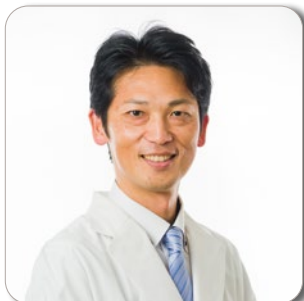
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**7/15 (Sat) 10:50-11:00**

The differences from the PETLIF were found in the extracted literature, patients' age, direct decompression, epidural or local anesthesia, approach, order of PPS, and cage insertion. In conclusion, PETLIF surgery is a practical, minimally invasive surgical technique for patients with lumbar degenerative diseases suffering from back and leg pain, demonstrating significant improvements in pain scores. However, it is essential to carefully consider the potential complications and continue to refine the surgical technique further to enhance the safety and efficacy of this procedure.

Speaker



**Professor**

**Kazuta Yamashita** (Japan)

- ▶ Associate Professor of Department of Orthopedics, The University of Tokushima, Tokushima, Japan

## Endoscopic Treatment of Low Back Pain with Annular High Intensity Zone (HIZ) Lesion

Kazuta Yamashita, Fumitake Tezuka, Kosuke Sugiura, Kozaburo Mizutani, Saori Soeda, Masashi Kumon, Koichi Saiyo Dept of Orthopedics, Tokushima University, Tokushima, Japan

**Introduction:** The relationship between discogenic low back pain (DLBP) and radiological findings of high-signal intensity zone (HIZ) in the posterior annular layer on MRI T2 weighted image is still controversial. In our department, the diagnosis of DLBP is conducted by the episode of chronic LBP in lumbar flexion motion, radiological finding of annular tear on axial slice of CT discogram, pain provocation during discogram, and temporal pain relief followed by lidocaine injection for the intervertebral disc with HIZ, which are thought to be good operative indication for full-endoscopic discectomy and thermal annuloplasty (FED-TA). In this study, we evaluated the effectiveness of FED-TA for non-athletes with DLBP.

**Materials and Methods:** Eighteen patients (15 men, 3 women) with DLBP who underwent FED-TA under local anesthesia were retrospectively reviewed. We evaluated the Japan Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ) and Visual Analogue Scale (VAS) before and around 6 months after their surgeries.

**Results:** Average age of patients were 31.8 years old. FED-TA were performed 26 intervertebral discs in 18 patients. Most frequent disc level was L4/L5 level in 15 discs,



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and followed L5/S1 in 10 discs, L3/L4 in 1 disc. Functional score of low back pain in JOABPEQ was 14 (0-71) in pre-operation to 57 (0-100) in post-operation respectively. Lumbar function was 58 (7-100) to 75 (17-100). Walking ability was 79 (7-100) to 85.5 (29-100). Social life function was 51 (8-86) to 57 (38-100). Mental health was 57 (3-100) to 62 (39-96). VAS in LBP was 6.5 (3-10) cm to 3.5 (0-9) cm. VAS in leg pain was 5 (0-9) cm to 1 (0-8) cm, and VAS in leg numbness was 4.5 (0-8) cm to 1 (0-6) cm.

**Discussion:** Lumbar arthrodesis can achieve good clinical result as a radical treatment of DLBP which lose mobile segment in exchange; however, adjacent segment disease frequently occurs in the future. Therefore, we should carefully apply to this procedure for young patients. Yeung and Tsou reported that DLBP with HIZ on MRI and toxic annular tear on CT discogram can be treated by FED-TA using a bipolar radio-frequency coagulator. From our results, FED-TA for DLBP achieved postoperative improvement of JOABPEQ functional score in low back pain and VAS in LBP. However, we experienced 3 cases who had less than 20 points improvement. It is necessary to examine the cases with poor functional scores. Limitation of this study is short-term clinical results at around postoperative 6 months, and we have to observe longer-term clinical outcome in the future.

## Speaker



### Professor

## Toh Charng Jeng (Malaysia)

- ▶ Dr. Toh Charng Jeng MBBS, MS(Neurosurgery), FIPP(WIP), Fellow of Neurosurgery (Melbourne), Mmed (Pain Management)
- ▶ Founding and Current President of Malaysia Society of Endoscopic Spine surgery.
- ▶ Immediate Past President of Malaysia Society of Interventional Pain Practitioner (MSIPP) 2018-2022 and Current advisor for MSIPP

## Current Status of Endoscopic Surgery in Malaysia

The evolution of spine surgery has changed armentaria from open surgery, microsurgery, to endoscopic assisted and, latest, to full endoscopic spine surgery. Endoscopic spinal surgery was initially used for lumbar disc lesions. With technological innovations and better understanding of endoscopic anatomy with the assistance of fluoroscopy and image-guided systems, the endoscopic spine can approach to different areas of the spine from craniovertebral junction to coccyx. As a result, the indications of endoscopic spine surgery continue to expand to treat many other conditions including infections and tumors.

Full uniportal endoscopic spine firstly brought into Malaysia in the year 2006 and later biportal was introduced in 2015. Currently, in Malaysia we have about 40 uniportal endoscopic spine surgeon and 20 biportal endoscopic spine surgeon. I believe the number will continue to increase in Malaysia.

Bearing in mind the theme of "honouring the past, treasuring the present, and nurturing the future", I founded the Malaysia Society of Endoscopic Spine Surgery (MSESS) on 25th May 2022 with a team of Neurosurgeons and orthospine surgeons. Although the experience of doing endoscopic spine surgery is still immature in Malaysia, MSESS has continued to strive to develop professional training opportunities in the post-pandemic era and secure few Memorandums of Understanding successfully with world-renowned endoscopic spine surgery societies. Consequently, these enable us to bring experts together with a focus on the forefront of patient safety, professional sustainability and establishing sustainable networks - for the future of professional empowerment, patients, and endless exploration of research possibilities.

This conference promises to be a wonderful sharing and social event in which we will all be "Valuing Together". See you all soon!



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## Luncheon Symposium (Baxter) Achieving Optimal Patient Positioning (Lateral-to-Prone Technique) in LLIF Surgeries

### Speaker



**Professor**

**Jae Chul Lee** (Korea)

- ▶ Soonchunhyang University Hospital, Seoul, Korea Professor
- ▶ Internship Seoul National University Hospital Seoul, Korea
- ▶ Residency - Orthopaedic Surgery Seoul National University Hospital Seoul, Korea

## Luncheon Symposium (Vantage & Spinendos) Current Techniques and Equipments of Full-Endoscopic Surgery - Go Back to Basics

### Moderator



#### Professor

### Dong Hwa Heo (Korea)

- ▶ Spine Center, Neurosurgery, Gangnam Nanoori Hospital. Seoul
- ▶ Center Head. Endoscopic Spine Surgery Center, Seoul Bumim Hospital
- ▶ Center Head. Spine Center, Champodonamu Hospital, Seoul
- ▶ M.S. College of Medicine, Yonsei University, Korea A
- ▶ Bachelor's Degree, Dept of Media Arts and Sciences, Open
- ▶ Ph.D. College of Medicine, Yonsei University, Korea



#### Professor

### Hyeun Sung Harrison Kim (Korea)

- ▶ Neurosurgery Specialist / Hospital Director of the Harrison Spinartus Hospital Chungdam
- ▶ Editor-in-Chief of JMISST
- ▶ Section Editor of World Neurosurgery
- ▶ Chair of 2019 NASS/Neurospine Endoscopic Spinal Surgery (ESS) Symposium and Cadaver Workshop

### Speaker



#### Professor

### Chien Min Chen (Taiwan)

- ▶ Division of Neurosurgery, Department of Surgery, Changhua Christian Hospital, Changhua.
- ▶ Director of minimally invasive spine center, Changhua Christian Hospital.
- ▶ Board of Surgery, Taiwan Surgical Association.



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7/15 (Sat) 12:20-13:00

## PASMISS Closing

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**Professor**

**Keng Chang Liu** (Taiwan)

- ▶ Director, Division of Spine Surgery, Department of Orthopedics, Buddhist Dalin Tzu Chi Hospital, Taiwan
- ▶ President, PASMISS & TSESS, 2023



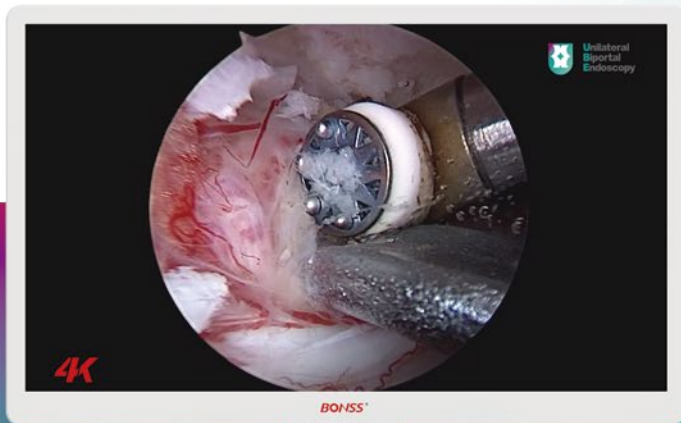
**Professor**

**Zhaomin Zheng** (China)

- ▶ Professor and Doctoral Supervisor at the First Hospital of Sun Yat-sen University.
- ▶ Director of the Pain Research Center of Sun Yat-sen University.



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### Moderator



**Professor**

**Chien Min Chen** (Taiwan)

Director of the Minimally Invasive and Endoscopic Spine Surgery Center at Changhua Christian Hospital.  
Director of the Neurosurgery Department at Changhua Christian Hospital. Director of the Neurosurgery Department at Yuanlin Christian Hospital.



**Professor**

**Kuo Pin Kuo** (Taiwan)

Orthopedic Specialist Committee Physician at Yonghe Cheng Hsin Hospital  
International Member of the North American Spine Society  
International Member of AO Spine



**Professor**

**Chien Chou Pan** (Taiwan)

Board Member of TSMISS  
Secretary-General of TWSS



**Professor**

**Meng Ting Wu** (Taiwan)

Attending Neurosurgeon, Department of Neurosurgery, Cheng Hsin General Hospital, Taipei, Taiwan  
Director of Taiwan Society of Minimally Invasive Spine Surgery  
Executive director of TSESS



**Professor**

**Ming Hsien Hu** (Taiwan)

Director of the Orthopedics Department at Hsinchu Mackay Memorial Hospital.  
Director of the Spine Department in the Orthopedics Department at Hsinchu Mackay Memorial Hospital.



## Speaker



**Professor**  
**Koichi Sairyo** (Japan)

- ▶ Professor and Chairman, Department of Orthopedics, Tokushima University, Tokushima, Japan.
- ▶ Professor and Chairman, Tokushima University
- ▶ Pacific Asian Society for Minimally Invasive Spine Surgery: PASMISS (Board member)
- ▶ World Congress Minimally Invasive Spine Surgery : WCMISST (Congress President 2021)

## Endoscopic trans-Kambin Lumbar Interbody Fusion

Koichi Sairyo, MD and PhD  
Department of Orthopedics, Tokushima University

Transforaminal full-endoscopic (fullendo) spine surgery (FESS) was first introduced as a method for performing discectomy. More recently, it has been used for decompression of lumbar spinal canal stenosis. The fullendo technique can also be performed for lumbar interbody fusion (LIF) through Kambin's triangle. Thus, we have proposed that this method be known as fullendo trans-Kambin's triangle lumbar interbody fusion (fullendo-KLIF). We have recently created an original fullendo-KLIF system. In this symposium, we wish to introduce our surgical procedure, report the initial clinical results, and review of literature. Using this first version system, we encountered exiting nerve root injury in 3 cases out of 38 (7.8%). To reduce the complication, we have created further original system called 'rescue cannula'.



Speaker



Professor

**Hyeun Sung Harrison Kim** (Korea)

- ▶ Neurosurgery Specialist / Hospital Director of the Harrison Spinartus Hospital Chungdam
- ▶ Editor-in-Chief of JMISST
- ▶ Section Editor of World Neurosurgery
- ▶ Chair of 2019 NASS/Neurospine wEndoscopic Spinal Surgery (ESS) Symposium and Cadaver Workshop

## Advanced Techniques of Full Endoscopic Transforaminal Lumbar Interbody Fusion

Hyeun-Sung Harrison Kim  
Harrison Spinartus Hospital Chungdam

Endoscopic spinal surgery is now becoming an important field of spinal surgery and treatment. In particular, endoscopic lumbar interbody fusion has recently made rapid progress. Its application range extends from simple single level lumbar interbody fusion to degenerative deformity correction.

In addition, through the research results so far, better clinical and surgical results have been shown, and through this, it is believed that endoscopic spinal surgery will be the future leader of spinal surgery, and today we will discuss the development process.

Speaker



Professor

**Jwo Luen Pao** (Taiwan)

- ▶ Head, Depart of Orthop. Surg, Far Eastern Memorial Hospital (FEMH), New Taipei, Taiwan
- ▶ Clinical Assistant Professor, Depart. Orthop. Surg, FEMH
- ▶ Chief, Division of Spine Surgery, Depart. Orthop. Surg, FEMH

## Biportal Endoscopic Transforaminal Lumbar Interbody Fusion Step-by-step Video Demonstration

Jwo-Luen Pao, MD  
Far-Eastern Memorial Hospital, New Taipei, Taiwan  
jwoluenpao@gmail.com

Minimally invasive surgical techniques have become the mainstream of modern surgical treatment in many fields, including spine surgeries. Since 2018, the Department of Orthopedic Surgery at Far Eastern Memorial Hospital has been developing the innovative "unilateral biportal endoscopic (UBE) technique". The UBE technique provides a bloodless surgical field and a magnified, crystal-clear visual, enabling spine surgeons to manage various spine pathologies in a delicate and safe way. Compared to traditional open techniques or tubular retractor-assisted minimally invasive techniques, patients receiving the UBE technique have much smaller surgical wounds, experience less pain, recover faster, and achieve excellent treatment results.

Recently, the UBE technique was applied to lumbar interbody fusion surgery in several pioneer studies with good and comparable treatment results with the conventional MIS-TLIF. While skin incisions, surgical approach, interbody fusion cages, and bone graft may vary, all these studies demonstrated the unique features of biportal endoscopic transforaminal lumbar interbody fusion (BETLIF) including a clear and magnified surgical field, direct neural decompression, radical discectomy, and preservation of bony endplate.

In this presentation, we are going to describe our BETLIF technique in details, to report the clinical outcomes and the radiological outcomes evaluated using computed tomography. We also cooperate with local manufacturers in Taiwan to develop specially designed surgical instruments and implants, aiming to shorten the learning curve, improve treatment results, and seek a new business model. We are happy to share our ideas with the members of this society.

Speaker



Professor

**Yi Hung Huang** (Taiwan)

- ▶ Chief of MISS Center (Center Of Minimally Invasive Spine Surgery)
- ▶ Chia Yi Christian Hospital Assistant Professor

## Navigation Guided Endo-TLIF in Degeneration Lumbar Lesion and: Tips and Tricks

Yi-Hung Huang, MD<sup>1,2</sup>

1.Chia Yi Christian Hospital 2. National Cheng Kung University Hospital Taiwan

Background: The endoscopic spine surgery(ESS) is rapidly developed in recent three decades and ESS combined with TLIF(endo-TLIF) is the new trend due to the least traumatization. Recently, Endo-TLIF has been successfully application with successful results. However, the adverseness of Endo-TLIF include overdose of radiation, overtime of bony work, and steep learning curves.

Objective: This report aimed to share the experience of navigation aided endo-TLIF and tricks of this novel technique.

Methods: We utilized robotic 3-D fluoroscope to obtain intraoperative tomographic images and transferred these images to the navigation center(Brainlab). We registered not only instruments for insertion of pedicular screws (drill-guide and pointer probe but also instrument for Endo-TLIF(obturator, trephine and cage holder).

Results: The radiation time was significantly lower than non-navigation Endo-TLIF. There was no breach of pedicular screws insertion or malposition of cage implantation.

Conclusions: Perioperative 3D total navigation assisted EndoTLIF has excellent clinical results and provides accurate intraoperative real-time guidance and help spinal surgeons achieve accurate bony works and implantation procedures. The novel Endo-TLIF can reduce radiation exposure and operation time, which improve the operative efficacy and safety.

Speaker



**Professor**

**Dong Hwa Heo** (Korea)

- ▶ Spine Center, Neurosurgery, Gangnam Nanoori Hospital. Seoul
- ▶ Center Head. Endoscopic Spine Surgery Center, Seoul Bumjin Hospital
- ▶ Center Head. Spine Center, Champodonamu Hospital, Seoul
- ▶ M.S. College of Medicine, Yonsei University, Korea A Bachelor's Degree, Dept of Media Arts and Sciences, Open
- ▶ Ph.D. College of Medicine, Yonsei University, Korea

## Complication Prevention and Management in Endoscopic Spine Surgery

Dong Hwa Heo, MD, PhD  
Endoscopic spine surgery, Neurosurgery, CPD Hospital, Seoul, South Korea.

Biportal endoscopic spine surgery is gaining popularity in managing degenerative lumbar diseases and has optimal indications and contraindications. Biportal endoscopic spine surgery is a minimally invasive surgical technique used for the treatment of various spinal conditions. While complications are relatively rare with this procedure, it's important to be aware of potential risks and take appropriate preventive and management measures.

The perioperative complications related to the biportal endoscopic approach affect the postoperative outcomes. Therefore, this study aimed to review the complications of biportal endoscopic decompression for lumbar stenosis.

Perioperative complications are typically minor; major complications include durotomy, epidural hematoma, incomplete decompression, infection, facet joint injury, neural injury, increased epidural pressure, and postoperative instability. Incidental durotomy and postoperative epidural hematomas are common complications of biportal endoscopic decompression. The appropriate management strategies may involve conservative measures, revision surgery, or other interventions tailored to the specific complication.

Ensure that the surgeon performing the procedure has appropriate training and experience in biportal endoscopic spine surgery. Skilled surgeons are more likely to



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**1F Ball Room B**

**7/15 (Sat) 14:18-14:30**

minimize the risk of complications. Proper patient selection is crucial. Evaluate patients thoroughly to determine if they are suitable candidates for biportal endoscopic spine surgery. Consider factors such as spinal condition, anatomical variations, medical history, and overall health. Ensure that the surgical team has access to high-quality and properly maintained equipment and instruments needed for biportal endoscopic spine surgery. This includes endoscopes, surgical instruments, and image guidance systems. Surgeons and the surgical team should be vigilant in identifying any potential complications during or after the procedure. Early recognition allows for timely intervention and management.

It's important to note that the prevention and management of complications in biportal endoscopic spine surgery require a multidisciplinary approach and adherence to established guidelines and best practices. Each patient's case should be evaluated individually, and decisions regarding prevention and management should be made in consultation with the patient and the surgical team.

## Video Contest

### Moderator



**Professor**

**Che Chia Hsu** (Taiwan)

Fixed Clinical Assistant Professor in the Department of Orthopedics Education at Cheng Kung University Hospital.  
Clinical Mentor in the Department of Orthopedics at Cheng Kung University Hospital.  
Attending Physician in the Department of Orthopedics at Cheng Kung University Hospital.

### Discussant



**Professor**

**Koichi Sairyo** (Japan)

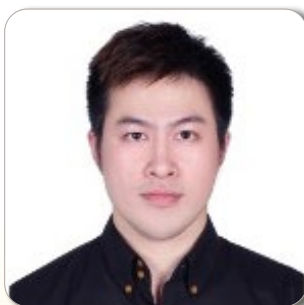
Professor and Chairman, Department of Orthopedics, Tokushima University  
Society Chairman, JapwSociety of Minimally Invasive Spine Surgery



**Professor**

**Hyeun Sung Harrison Kim** (Korea)

Neurosurgery Specialist / Hospital Director of the Harrison Spinartus Hospital Chungdam  
Editor-in-Chief of JMISST  
Section Editor of World Neurosurgery



**Professor**

**Heng Wei Liu** (Taiwan)

Assistant Professor in the Department of Surgery at Taipei Medical University.  
Neurosurgery Department at Taipei Medical University Shuang Ho Hospital.  
Director of Minimally Invasive Spine Surgery and Spinal Endoscopy at Taipei Neurological Institute.





## Discussant



**Professor**

**Chih Hui Chang** (Taiwan)

Attending Physician in the Neurosurgery Department at Kaohsiung Medical University Chung-Ho Memorial Hospital.  
Neurosurgical Specialist in the Republic of China (Taiwan)  
Neurocritical Care Specialist in Taiwan.



**Professor**

**Nan Fu Chen** (Taiwan)

Director of Taiwan Society of Endoscopic Spine Surgery (TSESS)  
Director, Department of Surgery, Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan  
Director, Outpatient and Emergency Department, Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan



**Professor**

**Kuo Tai Chen** (Taiwan)

Assistant Professor-level Attending Physician in the Academic Division of Neurosurgery at Chiayi Chang Gung Memorial Hospital.  
Member of Society for Minimally Invasive Spine Surgery.  
Member of NASS: North American Spine Society.



**Professor**

**Ting Chun Huang** (Taiwan)

Attending Physician in the Orthopedics Department at National Taiwan University Hospital Hsinchu Branch  
Executive Supervisor and Education Committee Member of the Taiwan Society of Minimally Invasive Spine Endoscopy.  
Education Committee Member of the 9th term of the Taiwan Society of Minimally Invasive Spine Surgery.

## Video Contest

### Speaker

14:30  
|  
14:42



**Biportal Endoscopic Unilateral Laminectomy Bilateral Decompression (ULBD) in Symptomatic Bilateral Recess Stenosis**

**Yen Sheng Chiang** (Taiwan)

► Buddhist Dalin Tzu Chi Hospital

14:42  
|  
14:54



**Cervical Spine Decompression Using Full Endoscope Surgery, from Basic to Advance, from Foraminotomy, Disectomy, Pediculotomy, Vertebrotoomy, SAP recsectiion to CE-ULBD**

**Shuo Chi Chien** (Taiwan)

► Chang Gung Memorial Hospital Linkou Center

14:54  
|  
15:06



**Multilevel Full Endoscopic Unilateral Laminoforaminotomy for Bilateral Decompression in Cervical Myeloradiculopathy**

**Kai Ting Chien** (Taiwan)

► Mackay Memorial Hospital, Taipei

15:06  
|  
15:18

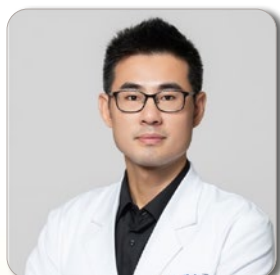


**Full-Endoscopic Foraminotomy and Disectomy for Degenerative Lumbar Foraminal Stenosis at L5/S1 Level**

**Yuan Fu Liu** (Taiwan)

► National Cheng Kung University Hospital

15:18  
|  
15:30



**Application of Revision Biportal Endoscopic Lumbar Interbody Fusion on Adjacent Segmental Degeneration With Unilateral Posterior Instrumentation And Double Cage**

**Yu Hung Chen** (Taiwan)

► Far Eastern Memorial Hospital



## TSESS Closing

---



**Professor**

**Keng Chang Liu** (Taiwan)

- ▶ Director, Division of Spine Surgery, Department of Orthopedics, Buddhist Dalin Tzu Chi Hospital, Taiwan
- ▶ President, PASMISS & TSESS, 2023



**Professor**

**Meng Ting Wu** (Taiwan)

- ▶ Attending Neurosurgeon, Department of Neurosurgery, Cheng Hsin General Hospital, Taipei, Taiwan
- ▶ Director of Taiwan Society of Minimally Invasive Spine Surgery
- ▶ Executive Director of TSESS

## Venue Information

### Convention Hall B

Plenary Lecture: History and Current Status of Minimally Invasive Spine Surgery (MISS)

PASMISS Opening Remark & Congratulatory Messages

Computer-Aid Surgery / Navigation and Robotics Best Paper Competition

Luncheon Symposium  
Adult Spinal Deformity (ASD)

Free Papers 2

Degenerative Spinal Diseases

Free Papers 4

Degenerative Spondylolisthesis

Degenerative Scoliosis

Free Papers 6

PASMISS Closing

Video Demonstration: How a Master Does

Video Contest

Video Contest Award

TSESS Closing

### Exhibition

Convention Hall A  
July 14 (Fri), 08:00-17:00  
July 15 (Sat), 08:00-15:30

### Coffee Break

Convention Hall A  
Conference Center Lobby

### Convention Hall C

Osteoporotic Vertebral Compression Fractures

Free Papers 1

Luncheon Symposium

Tumor & Infection

Free Papers 3

Cervical Spine

Free Papers 5

Concepts and Pitfalls for Endoscopic Spine Surgery

TSESS Opening Remark

Advancement of Endoscopic Surgery

### Preview Room

July 14 (Fri), 07:30-18:00  
July 15 (Sat), 07:30-15:00

### PASMISS Desk

Guest Lobby  
July 12 (Wed), 13:00-20:00  
July 13 (Thu), 09:00-20:00  
July 14 (Fri), 09:00-20:00  
July 15 (Sat), 09:00-13:00

### Social Program

Board meeting: Water Hall (3F)  
July 13 (Thu), 16:00-17:30

Welcome Party: Monaco Gallery (1F)  
July 13 (Thu), 18:00-21:00

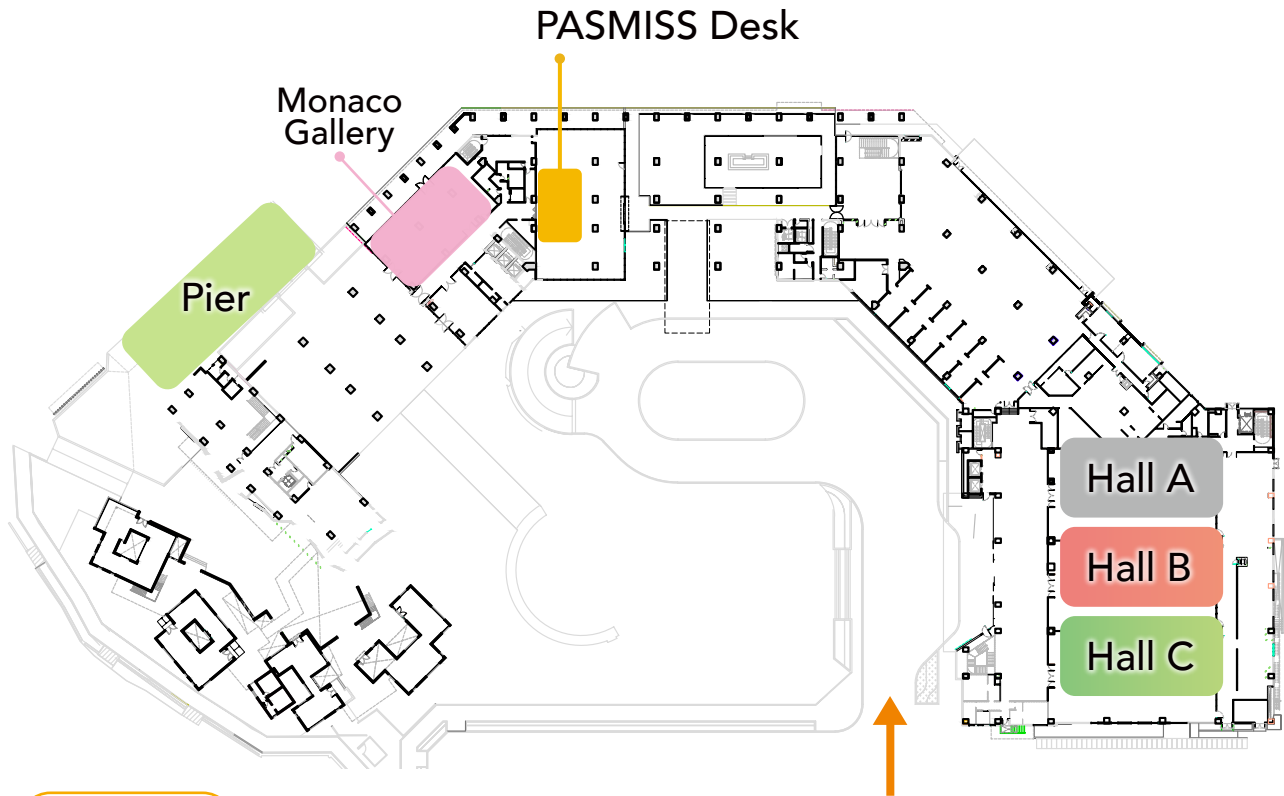
Gala Dinner: Bay Hall (3F)  
July 14 (Fri), 18:30-21:00

Formosa Yacht: Pier  
July 13 (Thu), 17:00/17:50

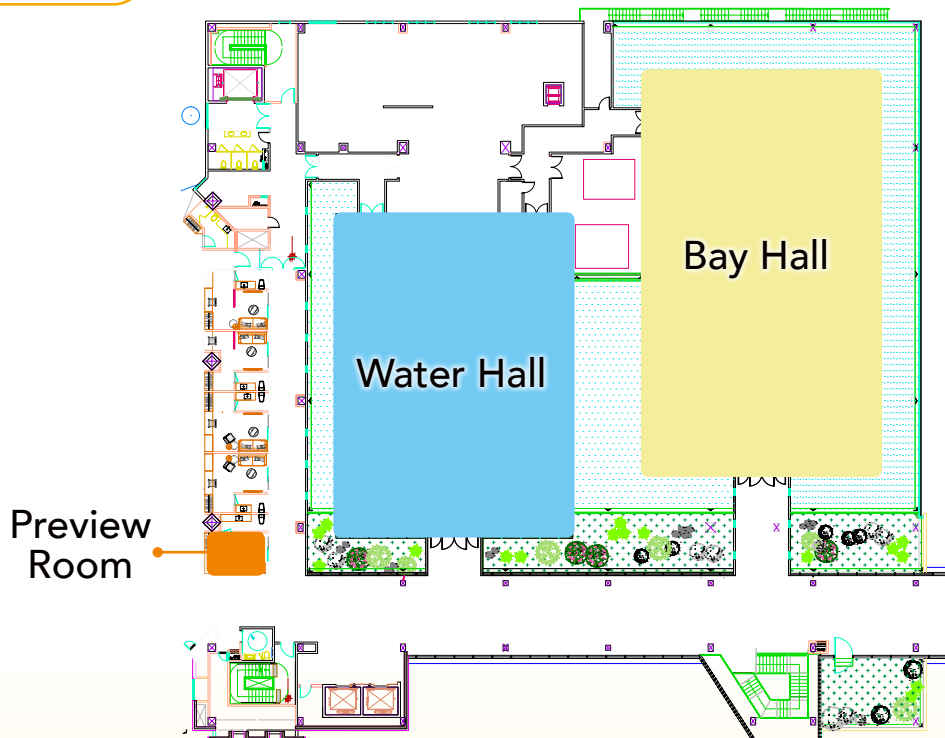


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## 1F



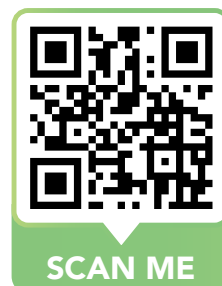
## 3F



## Conference Information

### E-Poster

Conference Center Lobby  
July 14 (Fri), 07:30-18:00  
July 15 (Sat), 07:30-18:00



### Board meeting

**Date:** July 13 (Thu), 16:00-17:30  
**Place:** Water Hall (3F)

### Welcome Party

**Date:** July 13 (Thu), 18:30-21:00  
**Place:** Monaco Gallery (1F)

### Gala Dinner

**Place:** Bay Hall (3F)  
**Date:** July 14(Fri), 18:30-21:00

### Formosa Yacht

**Date:** July 13 (Thu), 16:30 / 17:30

### City Tour

**Date:** July 13 (Thu), 09:30-16:00  
**Date:** July 14 (Fri), 09:30-16:00

#### 7/13:

- ▶ Chi Mei Museum
- ▶ Chihkan Tower
- ▶ Tainan Confucius Temple

#### 7/14:

- ▶ Navy Destroyer-The Only Warship Museum in Taiwan
- ▶ Taiwan Warship Museum
- ▶ CRYSTAL CHURCH / Beimen Visitor Center



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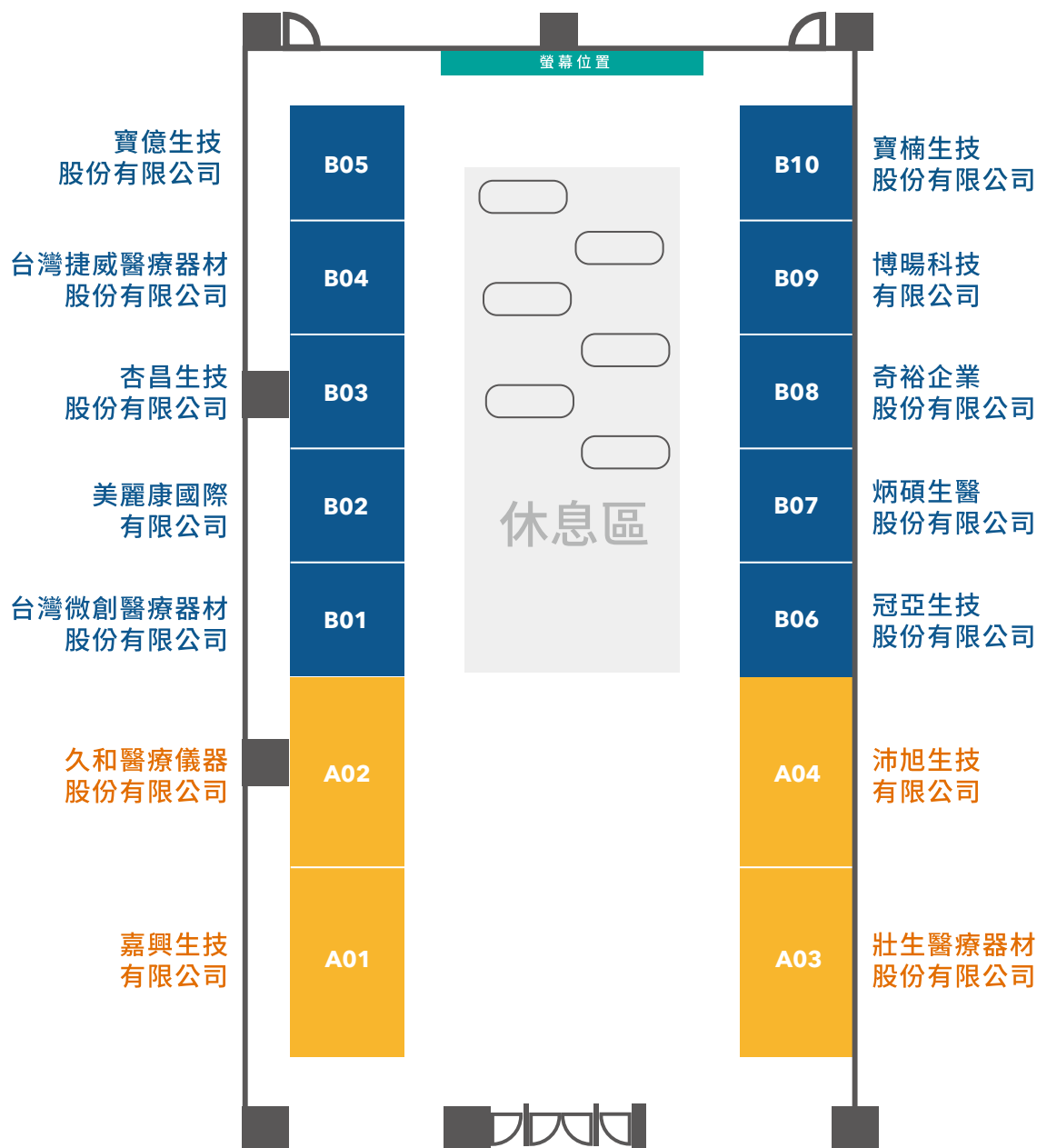


### Gold



## Booth Layout

福爾摩沙會議中心 1F 鳳凰A廳







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## Note

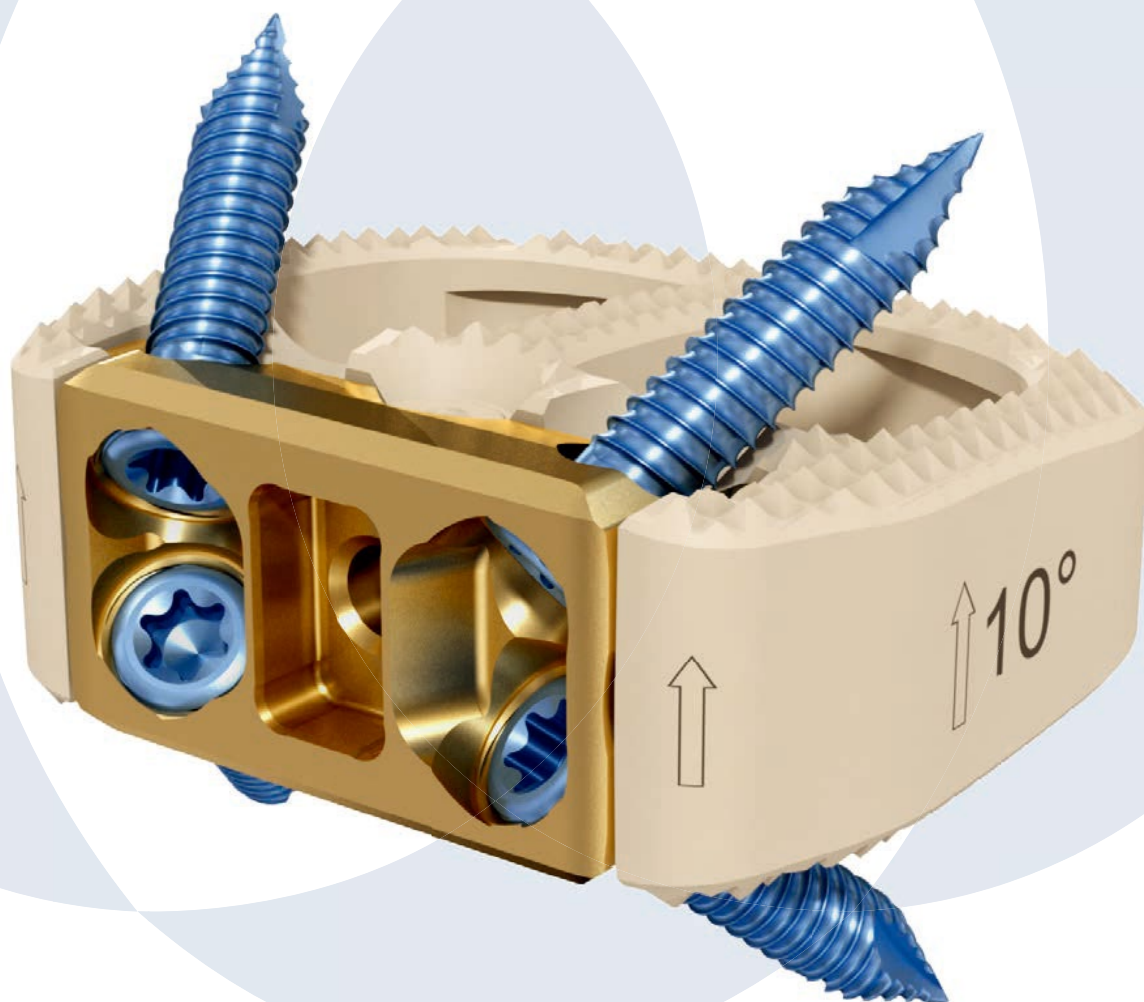
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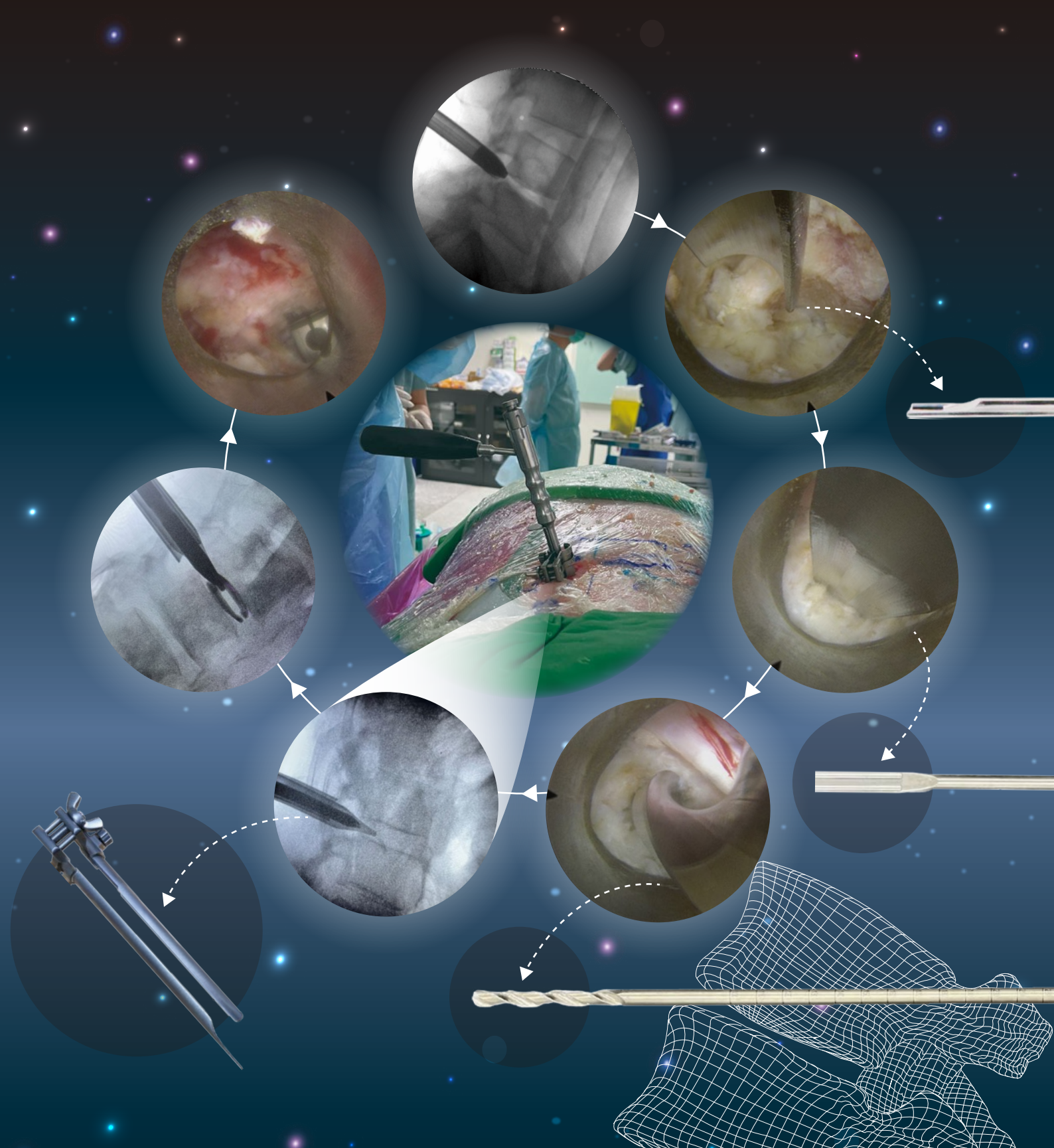
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