



# 15<sup>th</sup> ARC

## Annual Reconstruction Conference

November 3-4, 2023  
Kaohsiung, Taiwan



# Conformity™ Stem

## Femoral Hip System

- 4 Options for neck restoration
- Collared / Collarless options
- Medial step feature
- Fully HA coated surface



 15<sup>th</sup> 

ARC

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Annual  
Reconstruction  
Conference

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Karupiah MAHALINGAM / Ireland

2023 / 11 / 3 FRIDAY				
Time	Topic	Speaker	Country	
08:00~08:30	Registration			
08:30~08:35	Welcome Remarks	Jason LIN	Taiwan	
08:35~08:50	The Latest from United	Calvin LIN	Taiwan	
<b>SESSION 1 THE KNEE</b>		<b>Moderator</b>		
		Tain-Hsiung CHEN	Taiwan	
		Antonio TANCHULING	Philippines	
08:50~09:02	A Novel Solution for Knee PJI- Cellbrick Knee Spacer	Yu-Han CHANG	Taiwan	
09:02~09:14	In Vivo Analysis of Polyethylene Wear Particles After Total Knee Arthroplasty: The Influence of Improved Designs	Yukihide MINODA	Japan	
09:14~09:26	Enhanced Recovery Protocol for Total Knee Arthroplasty	Chong Bum CHANG	Korea	
09:26~09:38	Reconstruction after Knee PJI: The Undaunted Task	Antonio TANCHULING	Philippines	
09:38~09:50	Why Still to Use Navigation during Total Knee Arthroplasty?	Jean-Yves JENNY	France	
09:50~10:02	Robot Assisted Total Knee Arthroplasty Using U2 Implant	Chan YOON	Korea	
10:02~10:14	Pearls for Improvement of Function after TKA - Different Tools? or Different Concepts?	Tzai-Chiu YU	Taiwan	
10:14~10:34	<b>Discussion of session 1</b>			
10:34~10:54	Break			
<b>SESSION 2 THE KNEE</b>		<b>Moderator</b>		
		Chong Bum CHANG	Korea	
		Mohd Shahrul AZUAN	Malaysia	
10:54~11:06	Functional Alignment in Robotic Assisted Total Knee Arthroplasty	Oriol PUJOL	Spain	
11:06~11:18	Phenotype Oriented Gap Technique Total Knee arthroplasty with EM device - Surgical tip and pearls and case illustration	Kui-Chou HUANG	Taiwan	
11:18~11:30	Custom Kinematic Rotation Alignment in Knee Replacement, the MBC	Paul LEE	United Kingdom	
11:30~11:42	Relationship between Joint Laxity and Clinical Outcomes in MP TKA	Takashi SATO	Japan	
11:42~11:54	A Prospective Randomized Controlled Trial Comparing in vivo Kinematics during Weight-Bearing Activities in Medial-Pivot versus Posterior-Stabilized Total Knee Arthroplasty	Eiichi NAKAMURA	Japan	
11:54~12:14	<b>Discussion of session 2</b>			
12:14~13:50	Lunch			
<b>SESSION 3 THE HIP</b>		<b>Moderator</b>		
		Tzai-Chiu YU	Taiwan	
		Saúl MARTÍNEZ	Colombia	
13:50~14:02	Proximal Femur Mega-prosthesis, Design Philosophy and Clinical Applications	Ronald HILLOCK	United States	
14:02~14:14	Pedicle Freezing by Freezing Tank for Sarcoma of Limbs	Po-Kuei WU	Taiwan	
14:14~14:26	Catastrophic Failure of Femoral Head Due to Trunnionosis: A Case Report	Nilo PANER	Philippines	
14:26~14:38	Distal Femoral Supracondylar Osteotomy to Descend Inveterated Crowe 4 DDH Hips	Nicolás RESTREPO	Colombia	
14:38~14:50	The Influence of Fitting Pattern of Curved Short Stem on Femoral Bone Resorption / Stress Shielding after Primary Total Hip Arthroplasty	Yoshitada HARADA	Japan	
14:50~15:10	<b>Discussion of session 3</b>			
15:10~15:30	Break			

<b>SESSION 4 THE HIP</b>		<b>Moderator</b>	
		Yoshitada HARADA	Japan
		Albertus GANDAKUSUMA	Indonesia
15:30~15:42	The Standing Position of Corail-type Full HA-coated Stem and the Promise of Conformity Stem for Bone and Soft Tissue Sparing in Total Hip Arthroplasty	Satoshi NAGOYA	Japan
15:42~15:54	Effect of Total Hip Arthroplasty on Ipsilateral Lower Limb Alignment and Knee Joint Space Width: Minimum 5-Year Follow-Up	Yun-Seong CHOI	Korea
15:54~16:06	Surgical Options in the Treatment of Vancouver Type B2 and B3 Periprosthetic Fractures	Alejandro HERNÁNDEZ	Spain
16:06~16:18	Direct Anterior Approach (DAA) in Complex Total Hip Arthroplasty performed on a Standard Operating Table: Some Tips and Trick	Heine Rust DE JONGH	South Africa
16:18~16:30	Hip Replacement in Immature Bone with 5-year Follow-up from 12 to 18 Years	Delfilio MARTÍNEZ	Dominican Republic
16:30~16:50	<b>Discussion of session 4</b>		
16:50	End of the First Day		
18:45	<b>Banquet</b>		

## 2023 / 11 / 4 SATURDAY

Time	Topic	Speaker	Country
<b>SESSION 5 THE KNEE</b>		<b>Moderator</b>	
		Paul LEE	United Kingdom
		Jean-Yves JENNY	France
09:00~09:12	TKA Day Surgery	Jérôme VILLEMENOT	France
09:12~09:24	Arthroplasty as Treatment in Knee Fractures	Saúl MARTÍNEZ	Colombia
09:24~09:36	Treatment of Recurvatum Deformity in Primary and Revision TKA	Tzai-Chiu YU	Taiwan
09:36~09:48	Endoprosthesis in TKA When Indicated	Nicolás RESTREPO	Colombia
09:48~10:08	<b>Discussion of session 5</b>		
10:08~10:28	Break		
<b>SESSION 6 THE HIP</b>		<b>Moderator</b>	
		Kui-Chou HUANG	Taiwan
		Nicolás RESTREPO	Colombia
10:28~10:40	Locking Cage for Massive Acetabular Bone Loss: Clinical Results from the Designer's Series	Pang-Hsin HSIEH	Taiwan
10:40~10:52	Mini Posterior Approach (MPA) for Total Hip Replacement	Kuo-Cheng SHIH	Taiwan
10:52~11:04	Use of Mono-block Stems in Femoral Defects	Saúl MARTÍNEZ	Colombia
11:04~11:16	Are the Lewinneck Safe Zones Still Relevant Today?	Jose Fernando SYQUIA	Philippines
11:16~11:28	Two Stage Total Hip Arthroplasty for AVN Due to Septic Arthritis in the Hip Joint	Jachja ACHMAD	Indonesia
11:28~11:40	Early Results with the Conformity Cementless Stem	Karupiah MAHALINGAM	Ireland
11:40~12:00	<b>Discussion of session 6</b>		
12:00	End of the Conference		



**MODERATOR**

**Tain-Hsiung CHEN, M.D.**

- Professor, School of Medicine, National Yang Ming Chiao Tung University (NYCU), TAIWAN
- Former Deputy Superintendent, Taipei Veterans General Hospital, TAIWAN

**EDUCATION**

1967-1973 M.D, National Defense Medical Center  
POSTGRADUATE TRAINING

**POSTGRADUATE TRAINING**

1977-1982 Residency, Department of Surgery, Taipei Veterans General Hospital (Orthopaedic Surgery)

**FELLOWSHIP**

1984-1985 Mayo Clinic, Rochester, MN, USA  
1985 Memorial Sloan-Kettering Cancer Center, New York, NY, USA

**PREVIOUS ACADEMIC POSITION and EXPERIENCE**

1982-1989 Attending Orthopaedic Surgeon, Taipei Veterans General Hospital  
1990-2001 Chief, Division of Traumatology, Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital  
2002-2009 Chairman, Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital  
1998-2000 President, Joint Reconstruction Society, R.O.C  
2004-2006 President, Taiwan Orthopaedic Association Board Member, Asia-Pacific Orthopaedic Association

**ACADEMIC POSITION**

Professor, School of Medicine, National Yang-Ming University

**BIBLIOGRAPHY**

Professor Chen is an internationally renowned orthopaedic surgeon specializing in musculoskeletal tumor surgery, joint reconstruction surgery as well as traumatology. His and his team members have published many important articles on both clinical and basic research of bone tumor management, joint replacement, and tissue engineering of bone reconstruction with the use of stem cells.



## SESSION 1 THE KNEE



## MODERATOR

## Antonio TANCHULING, M.D.

- Orthopedic Surgeon, St. Luke's Medical Center, Quezon City and Global City, Philippines

**Medical School and Residency**

- Cebu Doctors' School of Medicine, 1983
- General Surgery, Cebu Doctors' Hospital, 1985 - 1987
- Traumatology and Orthopedics, National Orthopedic Hospital (Philippine Orthopedic Center), 1987- 1990

**Post - Residency Training / Fellowship**

- AO Trauma Fellow – Singapore General Hospital – 1991
- AOA Trauma Fellow – Center for Traumatology, Strasburg, France – 1992
- Osteoporosis and Bone Metabolic Disease, Edward Harriot Hospital, Lyon, France – 1993
- Adult Reconstruction and Total Joint Replacement, Clinical and Research Fellow
- Minneapolis Orthopedic and Arthritis Institute – University of Minnesota; and Orthopaedic Biomechanics Laboratory, Minneapolis, Minnesota, U.S.A. – 1995

**Past Position, Residents' Training Officer( RTO),** Institute of Orthopedics and Sports Medicine, St Luke's Medical Center, 1999 – 2005

**Chairman,** Institute of Orthopedics and Sports Medicine, St. Luke's Medical Center, Quezon City, Philippines – 2006 to present

**Head,** Center for Joint Replacement Surgery, St. Luke's Medical Center, Quezon City and Bonifacio Global City, Philippines – 2003 to present

**Consultant Staff -** Orthopedics, The Geriatric Center, St. Luke's Medical Center, Quezon City, Philippines – 1998 to present

**Asst. Professor II,** Orthopedics, St. Luke's Medical Center-William Quasha Memorial College of Medicine, Quezon City, Philippines – 1999 to 2010

**Past President,** The Philippine Hip and Knee Society – 2006

**Past Chairman,** The Philippine Board of Orthopedics, 2010

**Current Member, Philippine Board of Orthopaedics, Inc. –** Since 2005

**Research Interest:** Osteoporosis, Total Joint Replacement, Geriatric Hip Fractures – Replacement and Fixation

**Research Papers (Published from 2000- present)**

1. Management of Periprosthetic Infection of the Knee – Case Series
2. Preliminary Result of Cemented TKR – Consecutive Cases 2008-2014
3. Leg Length Discrepancy in THR – Patient's Perceived Results
4. Hip Replacement in Comminuted Intertrochanteric Fractures in the Elderly: Case Series
5. The Patella in TKR : To Resurface or Not to resurface
6. DVT in Adult Filipinos after Total Joint Replacement
7. Variation in Tourniquet Application in TKR : Comparative Case Series
8. Management of Dysplastic Hips with THR
9. Cementless THR with Anatomic Medio-lateral Femoral Stem
10. TKR in the Elderly: Result after 36 Months follow up

**Disclosure**

Advisory Board Member:

4 Pharmaceutical companies and 2 Orthopedic implant companies

*\*Receives educational and research grants from these companies.*



## Yu-Han CHANG, M.D, Ph.D.

- Professor of Division of Joint Reconstruction, Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Linkou, Taiwan

### FULL-TIME EMPLOYMENT

- Chief of Clinical Trial Center, Chang Gung Memorial Hospital, Linkou, Taiwan
- Chairman of Bio-Bank, Chang Gung Memorial Hospital, Linkou, Taiwan
- Vice Chairman of Institute Review Broad, Chang Gung Medical Foundation
- Professor of Division of Joint Reconstruction, Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Linkou, Taiwan

### RESEARCH FIELD

- Bone and joint Infection
- Stem Cell-Based Therapy
- Hip/Knee Arthroplasty

### SPECIALTIES

- Hip / Knee Arthroplasty
- Revision Hip/Knee Arthroplasty
- Stem Cell-Based Therapy

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## A Novel Solution for Knee PJI - Cellbrick Knee Spacer

### EDUCATION

PhD: Chang Gung University, Taoyuan, Taiwan 2002 - 2008

Graduate Institute of Clinical Medicine

MD: Chung Shan Medical University, Taichung, Taiwan. 1986 - 1993

### PUBLICATIONS-1st and Corresponding Author

1. Chen MF, Chang CH, Chung CN, Hsieh PH, Shih HN, Ueng SWN, Chang Y\*. Rapid analysis of bacterial composition in prosthetic joint infection by 16S rRNA metagenomic sequencing. Bone Joint Res. 2019 Aug 16;8(8):367-377. (Corresponding author)
2. Chen MF, Chang CH, Yang LY, Hsieh PH, Shih HN, Ueng SWN, Chang Y\*. Synovial fluid interleukin-16, interleukin-18, and CRELD2 as novel biomarkers of prosthetic joint infections. Bone Joint Res. 2019 May 3;8(4):179-188.
3. Sung LY, Wu MY, Lin MW, Hsu MN, Truong VA, Shen CC, Tu Y, Hwang KY, Tu AP, Chang Y\*, Hu YC\* Combining orthogonal CRISPR and CRISPRi systems for genome engineering and metabolic pathway modulation in Escherichia coli. Biotechnol Bioeng. 2019 May;116(5):1066-1079. (CO-Corresponding author)

Each Step We Care



## Yukihide MINODA, M.D, Ph.D.

- Associate Professor, Department of Orthopaedic Surgery,  
Osaka Metropolitan University, Osaka, Japan

### MAJOR RESEARCH INTERESTS

- Adult reconstructive surgery (hip and knee)
- Computer assisted surgery (navigation system; patient specific guide)
- Biomaterial (polyethylene wear)
- Bone mineral density around total joint prosthesis
- Ligament balancing in TKA

### EDITORIAL BOARD

2023 – present

Associate Editor of The Knee

### PUBLICATIONS

1. Minoda Y. Alignment techniques in total knee arthroplasty: Mechanical alignment, anatomical alignment, kinematic alignment, restricted kinematic alignment, inverse kinematic alignment, modified kinematic alignment, and functional alignment. *Journal of Joint Surgery and Research.* 2023;1:108-116.
2. Minoda Y, Ito M, Iwakiri K, Uchiyama K, Kawasaki M, Kanda M, Jinno T, Sugama R, Chiba D, Hasagawa M, Fujishiro T. The accuracy of an accelerometer-based portable navigation system for total hip arthroplasty using 3D CT measurement in the supine position: a prospective multicenter study. *Journal of Joint Surgery and Research.* 2023;1:133-138.

National registry data showed that number of total knee arthroplasty (TKA) is increasing, and number of TKA in younger patient is also increasing, but the revision rate in younger patients was very high. The most common cause for TKA revision is "infection" until 10 years postoperatively but "loosening" after 10 years postoperatively. To consider the next 20-30 years, measures against loosening are important. Polyethylene wear particles are generated in articulating surface, are phagocytosed by macrophage, induces osteoclasts via chemical mediators release, and finally results in loosening of TKA prosthesis. More, submicron-sized, sharp-shaped polyethylene wear particles more stimulate macrophage responses. To reduce polyethylene wear particles and to reduce loosening, new materials and new designs has been introduced in TKA. However, history tells us that such "new" designs and materials did not always result in "improved" clinical results. It takes decades to establish the long-term performance of newly introduced total joint prostheses. For early feedback of in vivo polyethylene wear generation in such new prostheses before they come into widespread use, we introduced in vivo polyethylene wear particle analysis. Our data showed that medial pivot design, ceramic femoral component, and highly cross-linked polyethylene (HXLPE) decreased the number of the polyethylene wear particles in total knee arthroplasty. Regarding loosening for decades, such design and material are preferable especially for young and active patients.

## In Vivo Analysis of Polyethylene Wear Particles After Total Knee Arthroplasty: The Influence of Improved Designs

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- 3. Minida Y, Sugama R, Ohta Y, Ohyama Y, Masuda S, Ikebuchi M, Nakamura H. The modification of bone cut angle and joint line obliquity did not change the tibiofemoral kinematics and stability of knee joint after total knee arthroplasty. Archives of Orthopaedic and Trauma Surgery in press
- 4. Ueyama H, Minoda Y, Sugama R, Ohta Y, Takemura S, Nakamura H. Mobile-bearing prosthesis suppresses the postoperative rotational mismatch and improves patient-reported outcome measurements better than fixed-bearing prosthesis: rotational analysis by 3D measurement in total knee arthroplasty. Arch Orthop Trauma Surg in press
- 5. Ueyama H, Nakagawa S, Kishimura Y, Minoda Y, Nakamura S, Koyanagi J, Yamamura M, Kadoya Y. Long-term clinical results of alumina ceramic medial pivot total knee arthroplasty: a 10-year follow-up study. Arthroplasty. 2023;19;5(:27.



## Chong Bum CHANG, M.D., Ph.D.

- Professor with Tenure, Department of Orthopaedic Surgery, Seoul National University College of Medicine, Seoul National University Bundang Hospital
- Chairman, Department of Orthopedic Surgery, Chairman, Joint Reconstruction Center, Seoul National University Bundang Hospital

### EDUCATION

- PhD (2006) Orthopedics & Tissue engineering, Seoul National University College of Medicine (Thesis title: Surface markers of synovial cell for chondrogenesis)

### COMMITTEE APPOINTMENT

2023 – present

- Editorial Board, J. arthroplasty

2020 – present

- Chairman, Insurance and Policy Committee, Korean Knee Society
- Chairman, Insurance and Policy Committee, Korean Arthroscopy Society
- Vice chairman, Academic Committee, Korean Knee Society
- Board member, National Examination Committee, Korean Orthopaedic Association
- Board member, Insurance and Policy Committee, Korean Orthopaedic Association

## Enhanced Recovery Protocol for Total Knee Arthroplasty

### Enhanced Recovery Protocol for Total Knee Arthroplasty

Chong Bum Chang, MD, PhD

Professor, Dept. of Orthopaedic Surgery,  
Seoul National University College of Medicine,  
Seoul National University Bundang Hospital, Korea

### Today's Story (con't)

#### New medical care flow of TKA patients

- Feeding up to 2hr(fluid)/6hr(solid) before anesthesia
- Limited use of IV fluid (< 0.5 ~ 1L)
- Limited use of tourniquet
- Light dressing without immobilizer
- Multimodal opioid-free pain control
- Allow upright position on bed just after arrival in ward
- Allow regular diet just after arrival in ward
- Allow ambulation as tolerated, even at the day of TKA
- Self flexion/extension exercise
- Return home in a week

### TKA: A Most Successful Surgery in Medicine



### TKA Outcomes: Reality

> 10% of TKA pts Get Serious Cx.

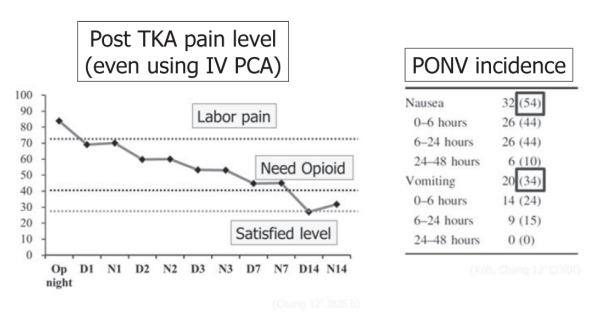
- ❖ In hospital serious cx. (mortality ...): 0.3 ~ 0.5%
- ❖ PJI: 0.5 ~ 2.0%
- ❖ Cx. requires readm./reop. within 90 days : ~ 10%

### What Do We Want Our TKA Patient to Be?

- ❖ Safely discharged after TKA
- ❖ Improved knee Sx. by TKA
- ❖ Improved QoL by improved knee Sx.
- ❖ 'Looks good' X-rays for the next 12 years

### TKA Outcomes: Reality

Very Painful, High PONV in Early PO



### Traditional TKA Outcomes in the Literatures

- 'Very Excellent'
- ❖ Excellent functional restoration
    - ✓ Marked improvement AKS, WOMAC... scores
  - ❖ Excellent longevity
    - ✓ 15Y survival in 95%

### How to Improve Our Patients Outcome after TKA?

### TKA Outcomes: Reality

Many 'Looks Good, but Feels Bad'

- ❖ Clinical scores not well reflect pt's satisfaction
  - ✓ Only modest correlation (Kwon 10' J arthroplasty)
- ❖ ~ 20% dissatisfaction at 1 or 2Y after TKA
  - ✓ Scott (10' 1217 pts) 19%,
  - ✓ Bourne (10' 1703 pts) 19%,
  - ✓ Gandhi (08' 1720 pts) 25%, ...

### When I've Felt My Pts Are Getting Better

- ❖ Modified Gap tech. with individualized planning
- ❖ Use of preemptive & PO 1D dexamethasone
- ❖ Use of periarticular multimodal drug injection
- ❖ Preemptive oral medications
- ❖ Stop using continuous FNB
- ❖ Stop using IV-PCA & routine opioids
- ❖ Limited use of tourniquet
- ❖ Reduce NPO time & IV fluid usage

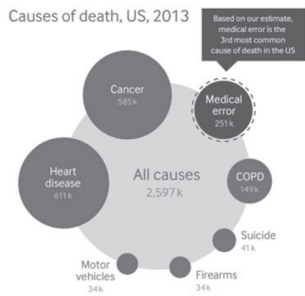
**ORR**  
Pain management protocols, post-operative pain and patient satisfaction after total knee replacement  
A MULTICENTRE STUDY  
© 2013 American Society of Anesthesiologists

**Preemptive Low-dose Dexamethasone Reduces Postoperative Pain and Pain After TKA: A Randomized Controlled Study**  
© 2013 American Society of Anesthesiologists

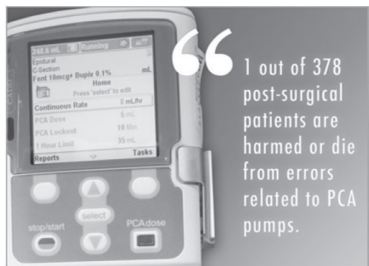
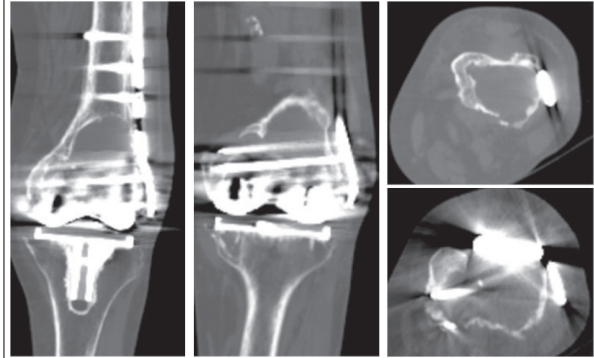
**Additional pain relieving effect of intraperiarticular injection after development of total TKA: a randomized controlled study**  
© 2013 American Society of Anesthesiologists

### Medical Error: 3<sup>rd</sup> Leading COD in US

Makary 16' The BMJ



### Preop. CT



(Physician-Patient Alliance for Health & Safety, Mar 25, 2013)

- ✓ More than 100 processes are required to set up
- ✓ 4 fold more harmful event than all other errors
- ✓ Human error >>> device malfunction

### Preop. Patient Condition

- ❖ ROM: -5 ~ 80
- ❖ Grade 3 M-L & Grade 1 AP instability
- ❖ ESR 33mm/hr (d/t anemia), CRP 0.03mg/dL
- ❖ DM (+), CAD on clopidogrel
- ❖ CKD (GFR: 35 ~ 40 ml/min)
- ❖ Severe Q. weakness (≈ 25% of age average)

Isokinetic muscle performance evaluation report -Knee

Peak Torque(Nm)	Involved side			
	Knee Extensor (60 d/s)		Knee Flexor (60 d/s)	
	INVOLVE	NON-INVOLVE	INVOLVE	NON-INVOLVE
	13.7	21.9	10.6	21.6

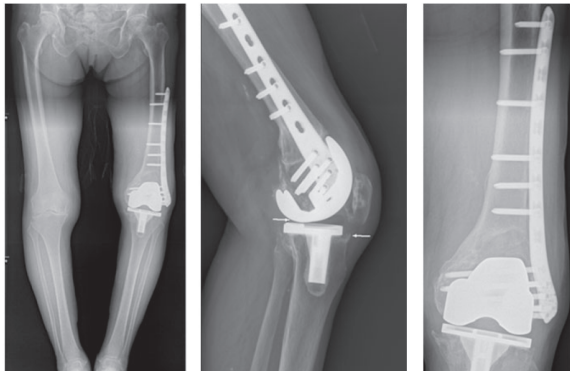
76Y/Female PO 1D (Op. on May 16, 2023)



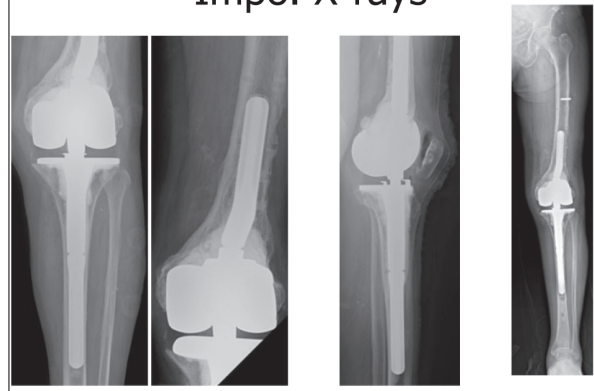
### Intraop. Photo



### Preop. X-rays



### Impo. X-rays





### Clinical Course

- ❖ Spinal anesthesia without urinary catheter
- ❖ Preemptive DXA 10mg, then 10mg-5mg at PO 1D
- ❖ Pain control with AAP, tridol, pregabalin (d/t CRF)
- ❖ Regular diet from Op day dinner
- ❖ 24-hour reduced dose IV cefazolin (2g q 12h)
- ❖ No transfusion
- ❖ Discharged home on PO 6D

### Ex: Bed Rest to Prevent PDPH

- ❖ Traditionally use 6-hr ABR after spinal anesthesia
- ❖ But, many patients complain of back pain, etc.
- ❖ Evidences?: DO NOT NEED!

**TAKE-HOME MESSAGE**  
Neither bed rest nor fluid supplementation decreases the incidence of headache after dural puncture.

**HOODS** Does Bed Rest or Fluid Supplementation Prevent Post-Dural Puncture Headache?  
EBEM Commentators  
Michael D. April, MD, DPHM  
Ben Loeg, MD (Annals of EM 18)

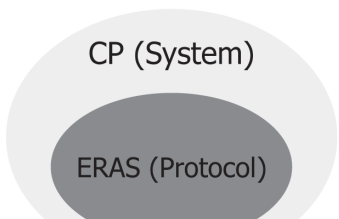
Summary results for the risk of post-dural puncture headache with bed rest or fluid supplementation.

Comparison	No. of Studies	No. of Participants	RR (95% CI)	P, %
Bed rest vs immediate mobilization	12	1,510	1.24 (1.04-1.48)	0
Fluid supplementation vs no supplementation	1	300	1.00 (0.99-1.00)	NR

NR, Not reported.

### Key System & Protocol for Pt. Care

- ❖ Clinical Pathway (CP)
- ❖ Enhanced Recovery after Surgery (ERAS)



### A Part of My OP. Day CP

```

V/S check : 병동올라오서 1회 => stable하면->q8hr
I/O check q 8hr
Position change q 2hr
NRD상식 (행행 : 금식->금식-일변상식) : 자석 상식 주세요.
수술 후 유동식-노엔피오(Fomula After Surgical Operation-NoNPO) (행행 : 금식->금식-일변상식) : 자석 식사 나오기 전까지 노엔피오와 잘 섭취 가능.
Active coughing
Deep breathing
Check sensory, motor, circulation
O2 inhalation via nasal prong : 2L/min
병동 올라오면 O2 nasal prong 2L 쉐 주세요. POD #2일까지 유지

spinal 마취 직후에도 환자 누워있지 않아도 됩니다. 환자에게 교육해 주세요.
병동 올라오면 sitting position 가능합니다.
병동 올라오면 배로 DVT 예방 pump apply (양수 다리)
ice pack apply 해주세요!!!

spinal 마취 직후에도 환자 누워있지 않아도 됩니다. 환자에게 교육해 주세요.
병동 올라오면 sitting position 가능합니다.
    
```

### Details of CP in Medical Care

- ❖ Best for complex but routine procedures
  - ✓ Inappropriate when significant uncertainty (+)
- ❖ Not a 'set order' but a integration of best practices
  - ✓ Based on evidences and capacity/availability
  - ✓ Sometimes need researches using own DB

### Op Record

Date of Surgery (MM/DD/YYYY): 2011-02-25  
 Diag. Diagnosis: Degenerative arthritis, knee, BL-  
 Postop. Diagnosis: Degenerative arthritis, knee, BL-  
 Anesthesia: Spinal-  
 Name of Operation :  
 Total knee replacement arthroplasty, knee, Rt. (LPS-flex)-  
 - F #0-  
 - T #2-  
 - I 10mm-  
 - P 25mm-  
 Operative findings:  
 1. Femoral condyle, patella, tibia: severe cartilage denudation 관찰되었음-  
 2. Patella는 degenerative change 있어 resurfacing 시행함-  
 Operative findings and procedure:  
 각주 인회전된 환자를 앞뒤로 누인 후 통상적인 방법으로 draping 후 tourniquet을 부풀림.  
 Midpatellar skin incision을 남긴 뒤 medial parapatellar approach로 patella의 quadriceps tendon을 lateral로 retract한 뒤 knee joint를 expose시킨 후 joint 주변에 protruding osteophytes를 제거함.  
 Femoral medial condyle 및 tibial medial condyle의 articular cartilage의 denudation이 관찰됨 joint의 medial compartment가 매우 좁아 거의 퇴락한 상태였으며 ACL과 MM, LM을 제거함.  
 Anatomical axis와 femoral alignment, rotation을 정한 뒤 the distal femoral condyles를 제거하고 AP femoral cutting, femoral notch cutting, chamfer cutting을 순서대로 시행함.  
 Tibial rotation과 long axis를 설정한 뒤 tibial cutting block의 따라 oscillating saw를 이용하여 tibial plateau resection함.  
 Femoral, tibial 및 meniscal insert trial를 insertion한 후 적절한 ROM과 flexion 및 extension gap을 확인함. ROM이 flexion contracture가 없었고 further flexion 120도이상 가능하였음. Trial를 제거한 후 massive irrigation을 시행함.  
 Patella는 degenerative change 없이 preserve함. Cement가 완전히 cooling되고 골을 따라가 irrigation함.  
 ROM을 시켜 patella가 tracking이 잘 됨을 확인함. Massive irrigation 후 H-333 insertion 후 layer by layer로 wound closure함. Compressive dressing 후 수술을 종료함.

### Details of CP in Medical Care (con't)

- ❖ Collaboration with all relevant department
  - ✓ Find rate limiting steps and solve them
- ❖ Select more cost-effective practice
- ❖ Remove hereditary but unnecessary practice
- ❖ Reduce burden of co-workers
- ❖ Regular feedback and monitoring!

```

1. Overall Information :
* ROM under anesthesia: 90 - 100
* PCL management: PCL-inhibiting
* Bowing type: FTKED bowing
* Polyethylene thickness (mm): 10-
* Fixation: Cemented
* Patella: Resurfacing
* None of implant U7 (U7.5, T2)
2. Operative Procedure :
* Approach: medial-parapatellar approach without excision of patella
* Femoral cutting :
1. Entry point Center
2. V-lines: 7 (dist. VM)
3. 9 mm cutting
4. Size: 1.5-
5. ER: -5 (ACTUAL 6)
* Tibial cutting: 8 mm from LIP highest surface (dist. Vic)
* Soft tissue release :
1. dBL: Complete
2. dBL: None
3. SM incise: Complete
4. SM incise: None
5. PCL: None
6. PM capsule: None
7. Central capsule: None
8. PL capsule: None
9. PM tibial side: Complete
10. ITB: None
11. PL: None
12. LCL: None
* Final ligament balance :
1. 0 degree (MEL): 10 -11
2. 90 degree (MEL): 11 - 12
* Fixation: 3rd generation, GM aligned Hip (CEMAX)
3. Findings after TKA :
* ROM :
1. Passive HE: 5-
2. FC: 9-
3. FT under gravity: 120-
* PF tracking: NTT
* Overhang (Femur) :
1. AL: None
2. CL: None
3. PL: None
4. AM: None
5. CM: None
6. PM: None
* Overhang (Tibia) :
1. AL: None
2. PL: None
3. AM: None
4. PM: None
4. Special Remarks:
Periarticular cocktail injection for pain control-
Patellar condition 2A 50%
    
```

## ERAS Protocol

- Developed by European surgeon group (2001)
- ❖ Previously 'fast-track surgery' had been described
  - ❖ But, ERAS group emphasized 'quality' rather 'speed'

Table 1. Member Sites and Leads of the Original Enhanced Recovery After Surgery Study Group Formed in 2001

University and Hospital	Country	Lead(s)
University of Edinburgh	United Kingdom	Ken Fearon
Karolinska Institutet and Ersta Hospital Stockholm	Sweden	Olle Ljungqvist
University of Copenhagen and Hvidovre Hospital	Denmark	Henrik Kehlet
University of Northern Norway and Tromsø Hospital	Norway	Arthur Revhaug
University of Maastricht	The Netherlands	Martin von Meyenfeldt, Cornelius DeJong

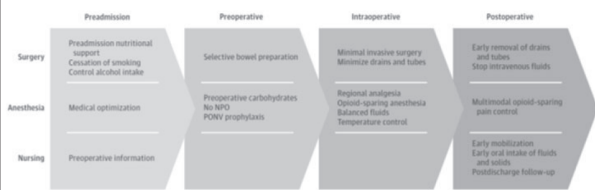
(17' Ljungqvist JAMA Surg.)

## 2017 ESPEN Guideline

- ❖ Patients undergoing surgery, who have no specific risk of aspiration, shall drink clear fluids until two hours before anesthesia. Solids shall be allowed until six hours before anesthesia. (A, 97% agreement)
- ❖ In order to reduce perioperative discomfort including anxiety, oral preop. carbohydrate treatment the night before and two hours before surgery should be administered. (A/B, 100%)
- ❖ Oral intake, including clear liquids, shall be initiated within hours after surgery in most patients (A, 100%)

## ERAS: Goals

- Safe & early recovery
- ❖ To maintaining preop. organ function
  - ❖ To reduce profound stress response
  - ❖ To retain anabolic homeostasis



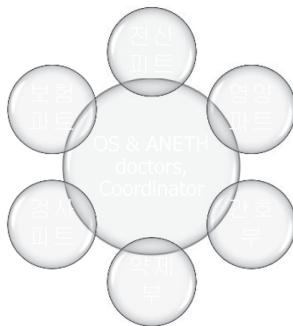
(17' Ljungqvist JAMA Surg.)

## Carbohydrate Drink: Practical Issue

- ❖ Evidences of its value (lots of papers)
  - ✓ Reduce thirsty & anxiety & PO constipation
  - ✓ Reduce insulin resistance & inflammation
  - ✓ Reduce hospital stay
- ❖ BUT, obstacles ...
  - ✓ Reimbursement issue
  - ✓ Burden related to delivery & timing

## Just a Set Order Doesn't Work!

Multiprofessional, multidisciplinary team approach!



## Ex.#2. Prevention of Peri-op. Hypothermia

- ❖ Even mild hypothermia can lead to several PO Cx.
  - ✓ Morbid myocardial events
  - ✓ Increased risk of surgical peri-prosthetic infections
  - ✓ Increased duration of hospitalization
  - ✓ Increased blood loss
  - ✓ Prolonged post-anesthetic recovery

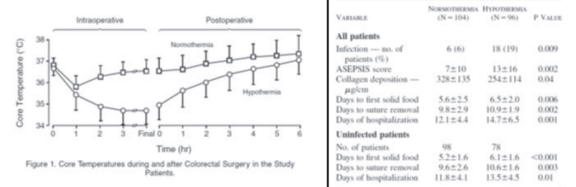
## Ex.#1: NPO Time & Carbohydrate Loading

- ❖ Traditional NPO (MNNPO): d/t concern of aspiration
- ❖ But, numerous studies against long NPO time
  - ✓ Current recomm: NPO of 2h fluid, 6h solid food
- ❖ CHO beverage during NPO can reduce PO Cx.
  - ✓ Reduce insulin resistance
  - ✓ Reduce inflammation (Pogatschnik 15' Nutrition in clinical practice)



## Peri-operative Hypothermia (con't)

- Kurz 96' NEJM, 200 colorectal surgery pts, RCT
- ❖ 96 hypothermia G: routine intraop. thermal care
    - ✓ Ambient temp. forced-air cover, no IV fluid warming
  - ❖ 104 normothermia G: additional warming
    - ✓ 40° temp. forced-air cover, IV fluid warming



### Hypothermia is Frequent in TJA pts

- Leijtens 13' J arthroplasty 415 THA, 257 TKA pts
- ❖ Use forced-air warming but no fluid warming
  - ❖ Measure core temp. just after surgical closure
  - ❖ Mean core temperature: 36.25 °C
    - ✓ TKA group: 36.19 °C, THA: 36.29 °C ( $P=0.019$ )
  - ❖ Hypothermia (core temp < 36°): 26.9%
    - ✓ TKA group: 28%, THA: 26.3% ( $P=0.62$ )
  - ❖ PO PJI: 7 pts (only in THA pts)
    - ✓ Hypothermic G: 3.7%, Normothermic: 1.0% ( $P=0.061$ )

### 16 Items of CP & ERAS for TKA (con't)

9. Postop. nausea/vomiting (PONV) management
10. Blood saving protocol
11. VTE prophylaxis
12. Periop. posture, ambulation, and rehabilitation
13. Perioperative GI & GU integrity management
14. Periop. sleep disturbance management
15. Mx. of osteoporosis and periprosthetic bone loss
16. Postop. follow-up and clinical evaluation protocol

### Recommendations to Avoid Hypothermia

- ❖ Use forced air warming in every high risk pt
  - ✓ Start forced air warming preop. if temp.is below 36 °C
  - ✓ Measure temp. before & every 30 min after induction
  - ✓ Adjust settings of forced air to maintain > 36.5 °C
- ❖ Keep ambient temp. > 21 °C while pt. is exposed
- ❖ Warm iv fluids & blood products to 37 °C

### Symptoms Evaluation (Patient Selection)

- ❖ Find all sources of pain and discomfort
- ❖ Establish Mx. for pain from other than knee
  - ✓ ≥ Mod. degree spine origin pain (~ 50%)
  - ✓ Neuropathic pain (~ 15%), Depressive Sx. (~ 17%)
  - ✓ RLS (~ 8%)

### Hypothermia Prevention: Practical Issue

- ❖ Evidences of its value (lots of papers)
  - ✓ Intraop hypothermia increase infection & Cx.
  - ✓ Upto 30% incidence in TKA patients
- ❖ Methods
  - ✓ Pre-anesthesia warming
  - ✓ Forced air warming during op.
  - ✓ Warmed IV fluids (esp. blood)
- ❖ Obstacles
  - ✓ Equipment & reimbursement issue
  - ✓ Cooperation of anesthesiologist and nurse

### Sx. from L-S spine in TKA Candidates

- ❖ Half of the TKA candidates have Sx. from L-S spine
  - ✓ Moderate & severe degrees
  - ✓ esp. persistent RP adversely affects pt. outcomes
- ❖ Additional spine injection improve outcomes (Lee, 13 AJR)

Clin Orthop Rel Res  
DOI: 10.1007/s11999-013-2926-7

**CLINICAL RESEARCH**

**Clinical Orthopaedics and Related Research**

**Coexisting Lumbar Spondylosis in Patients Undergoing TKA: How Common and How Serious?**

Chong Bum Chang MD, PhD, Kim Woo Park MD, Yoon Geul Kang MS, Tae Kyun Kim MD, PhD

### 16 Items of CP & ERAS for TKA

1. Symptoms evaluation (patient selection)
2. Radiographic evaluation
3. Preoperative medical clearance, preparation
4. Preoperative clinical score evaluation
5. Preoperative patient education
6. Preoperative planning for TKA
7. Operating theater management
8. Perioperative pain management

### Neuropathic Pain in Knee OA Pts

- ❖ 1/3 of knee OA pts has NP (Hochman 13' OAC; Soni 13' A&R...)
  - ✓ Burning, painful cold, itching, numbness...
  - ✓ Referred pain around the knee, thigh, & upper tibia
- ❖ Potential source of persistent pain after TKA
- ❖ Treatment
  - ✓ Serotonin NE reuptake inhibitors (SNRIs): Duloxetine
  - ✓ Gabapentinoids: Gabapentin & Pregabalin

Original Article

**JKMS**

**Presence of Night Pain, Neuropathic Pain, or Depressive Disorder Does Not Adversely Affect Outcomes After Total Knee Arthroplasty: A Prospective Cohort Study**

Minyoung Park, MD, PhD, Jongsik Park, MD, PhD, Hyeon Gook Kim, MD, PhD, Sanghyun Park, MD, PhD, Hyeon Gook Kim, MD, PhD, Sanghyun Park, MD, PhD

### Screening for Neuropathic Pain Component in Knee OA DN4 (Bouhassira 05' Pain)

**INTERVIEW OF THE PATIENT**

**Question 1:** Does the pain have one or more of the following characteristics?

- 1 - Burning
- 2 - Painful cold
- 3 - Electric shocks

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

**Question 2:** Is the pain associated with one or more of the following symptoms in the same area?

- 4 - Tingling
- 5 - Pins and needles
- 6 - Numbness
- 7 - Itching

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

**EXAMINATION OF THE PATIENT**

**Question 3:** Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?

- 8 - Hypoesthesia to touch
- 9 - Hypoesthesia to prick

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

**Question 4:** In the painful area, can the pain be caused or increased by:

- 10 - Brushing

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

≥ 4/10: Neuropathic pain

### RLS: Epidemiology

- ❖ 3 - 15% of the US population (Ramar' 13 Am. family phys.)
- ❖ 7% of the Chinese population (Li' 12 Sleep Med.)
- ❖ Female > Male
- ❖ Often unrecognized or misdiagnosed
  - ✓ Many pts are not diagnosed until > 10Y after Sx. onset.
  - ✓ Freq. underwent unnecessary knee/spine surgeries

### Restless Legs Syndrome

- ❖ Still unclear, but widely accepted theories ...
  - ✓ Abnormalities in CNS dopamine pathways
  - ✓ Impaired iron homeostasis

### RLS: Why Knee Surgeons Care About?

- ❖ Originally, psychiatric disease
- ❖ But, patients visit orthopaedic clinic frequently
- ❖ Prevalence of RLS in TKA patients? (unpublished data)
  - ✓ Preoperatively, about 8%
  - ✓ Severe RLS: 3 - 4 % of the pts undergoing TKA
  - ✓ Can be a cause of dissatisfaction after TKA

### RLS: Symptoms

- ❖ Uncomfortable sensations in the legs
  - ✓ Itchy, pins & needles, or creepy crawly feeling
- ❖ Worse at rest, esp. when lying or sitting
  - ✓ Worse in the evening and at night
- ❖ Get better when moving
  - ✓ Irresistible urge to move legs to relieve the Sx.

### Restless Legs Syndrome Rating Scale

**Restless Legs Syndrome Rating Scale**

C. Have the patient rate his/her symptoms for the following ten questions. The patient and not the examiner should make the ratings, but the examiner should be available to clarify any misunderstandings the patient may have about the questions. Either the examiner or the patient may mark the answers on the form.

1. **Overall:** how would you rate the RLS discomfort in your legs or arms?
  - (4) Very severe
  - (3) Severe
  - (2) Moderate
  - (1) Mild
  - (0) None
2. **Overall:** how would you rate the need to move around because of your RLS symptoms?
  - (4) Very severe
  - (3) Severe
  - (2) Moderate
  - (1) Mild
  - (0) None
3. **Overall:** how much relief of your RLS arm or leg discomfort do you get from moving around?
  - (4) No relief
  - (3) Slight relief
  - (2) Moderate relief
  - (1) Either complete or almost complete relief
  - (0) No RLS symptoms and therefore question does not apply
4. **Overall:** how severe is your sleep disturbance from your RLS symptoms?
  - (4) Very severe
  - (3) Severe
  - (2) Moderate
  - (1) Mild
  - (0) None
5. How severe is your irritability or sleepiness from your RLS symptoms?
  - (4) Very severe
  - (3) Severe
  - (2) Moderate
  - (1) Mild
  - (0) None

### RLS: Symptoms (con't)

- ❖ May cause severe nightly sleep disruption
  - ✓ Significant daytime fatigue
- ❖ Severe impairment of QoL

### RLS: Treatment

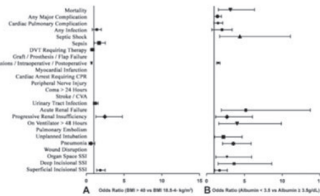
- ❖ Dopaminergic Rc. agonist
  - ✓ Pramipexole (Mirapex): 0.25mg qd po hs
  - ✓ Ropinirole (Requip)
- ❖ Gabapentinoid (Gabapentin, Pregabalin)
- ❖ Opioids
- ❖ Iron supplement if ferritin < 50 ng/mL

If Dx is correct, Sx would be **DRAMATICALLY** improved within a couple of weeks

### Preop. Medical Clearance, Preparation

#### Nutritional assessment

- ❖ Malnutrition: critical risk factor for PO Cx.
- ❖ Nelson 15' CORR, Review of 77,785 TKA patients
  - ✓ NSQIP database 06' - 13'
  - ✓ Morbid obesity (BMI ≥ 40) & malnutrition (Alb < 3.5)



### Preop. Assessment of Nutritional Status

Hx., disease, anthropometric data, dietary, ...

- ❖ Serum markers are often used indicators
  - ✓ Alb (3.5g/dL), TLC (1500cells/mm<sup>3</sup>), transferrin (200mg/dL)

SNU Screening

항목	R1	R2	R3
나이(세)		> 75	
s-Alb(g/dl)	< 2.8	2.8 ~ 3.3	≥ 3.3
Cholesterol(mg/dl)		< 130	
TLC(백/mm <sup>3</sup> )	800미만		1500이상
Hb(g/dl)		<13(남), <12(여)	
BMI(kg/m <sup>2</sup> )		18 <, or > 27	
식욕상태		나쁨	보통
체중변화	심한 감소	약간의 감소	없음
소화기장애		있음	

고위험군: 2개 이상 R1, or R1 1개 + R2 2개 이상  
중등도위험군: R1 1개 or R2 2개 이상

### Care Flow of TKA Patients Based on CP & ERAS

#### Preadmission: 6W - 8W before TKA

- ❖ Confirm the scheduled TKA
- ❖ Assess the preexisting co-morbidities
  - ✓ Order examinations for anesthesia & operation
  - ✓ Consultation to relevant specialist, if needed
- ❖ Assess scoring systems (KOOS, EQ-5D, VAS ...)

### Nutritional Factors Play a Role in TKA Pts

Closely related to immunity & healing

- ❖ Serum albumin
- ❖ Serum iron/transferrin
- ❖ Vitamin D
- ❖ Serum zinc
- ❖ Adiposity

#### Nutritional Interventions.

1. Protein Supplements	1 gm/kg/qd × 10-14 d
2. Iron supplementation	324 mg PO TID × 3-4 wk
3. Vitamin D	1000 IU daily unless deficient. If <20 ng/dL, 50,000 IU weekly × 8 wk. For levels 20-30 ng/dL, 5000 IU daily × 3-6 mo.
4. Vitamin C	500 mg qd × 2 wk
5. Zinc sulfate	220 mg/qd

(Golladay 16' J Arthroplasty)

#### Preadmission: 3 - 4W before TKA

- ❖ Check medical clearance results
- ❖ Assess other pain sources
  - ✓ L-S spine, RLS, neuropathic pain
  - ✓ Presence of depression, sleep quality
- ❖ Assess all radiographic exams
  - ✓ Check need for special equipment preparation
- ❖ Performed P/E & education
  - ✓ Encourage preop. ROM & muscle strengthening
- ❖ Correct malnutrition, deficiencies
- ❖ Get op. permission

### NPO Time & Carbohydrate Loading

- ❖ Traditional NPO (MNNPO): d/t concern of aspiration
- ❖ But, numerous studies against long NPO time
  - ✓ Current recomm: NPO of 2h fluid, 6h solid food
- ❖ CHO beverage during NPO can reduce PO Cx.
  - ✓ Reduce insulin resistance
  - ✓ Reduce inflammation (Pogatschnik 15' Nutrition in clinical practice)



### Patient Education

- ❖ Education manual (12 page)
  - ✓ Operative procedure
  - ✓ Anesthesia
  - ✓ Pain level and management method
  - ✓ Rehab. program



### Preadmission: 2 - 4D before TKA

- Review all the scheduled patients in the week
- ❖ With fellows, residents, PA, RA
- ❖ Assess the need of special care
- ❖ Determine the optimal prosthesis in each patient

환자의 예외  
같은 수술 환자 scoring 점수 전달  
도입(4D)  
(KOSIS/2020년)

4D(월) OP	장문지(1641556)	108/11
	홍광지(1403278)	127/12
	신동욱(1640374)	106/10
	윤영지(1236668)	83/9
	정순욱(1272584)	113/12
4D(월) OP	김영욱(1201910)	118/10
	김수민(1111914)	108/10
	박만영(1448150)	101/11
	홍영지(1756305)	84/9
	이순영(1951767)	105/13
	장무영(2491372)	96/8

입니다.  
감사합니다.

### Intraoperative Period (con't)

- ❖ Minimum use of tourniquet (~ 15 min)
  - ✓ Apply tourniquet (250 mmHg)
  - ✓ Capsular incision & basic release
  - ✓ Periarticular inj.: fat pad, gutter, med. side of the knee
  - ✓ Distal femur & proximal tibial resection
  - ✓ Periarticular inj. around post. side of the knee
  - ✓ Release tourniquet
  - ✓ Complete resection & balance
  - ✓ Fixation surface preparation using pulsatile lavage
  - ✓ Implant fixation

### Preoperative Period (OP Date)

- ❖ CHO beverage 2 bottles (400cc)
  - ✓ Method & time of taking: educated by a charge resident
- ❖ Preemptive medication (on call basis)
  - ✓ Celecoxib 200 mg
  - ✓ Pregabalin 75 mg
  - ✓ Acetaminophen 650 mg
  - ✓ Dexamethasone 10 mg iv
  - ✓ 5-HT3 antagonist

### Preparation for Tourniquet-less TKA

- ❖ IV TXA during induction
- ❖ Early periarticular cocktail injection



### Intraoperative Period

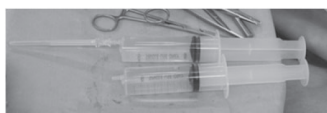
- ❖ Pre-warming in waiting room (15 min)
- ❖ No hair removal!
- ❖ No nerve block
- ❖ Spinal anesthesia in almost all cases
  - ✓ Continuing aspirin (even IM doctor recommend to quit)
- ❖ Apply forced-air warming on upper body
- ❖ Administration of TXA (1g, N/S mix, IV over 10 min)

### Fixation in Limited Tourniquet TKA



### Intraoperative Period (con't)

- ❖ Preparation of periarticular drug cocktail
  - ✓ Ropivacaine 300 mg (0.75% 20 ml x 2A)
  - ✓ Morphine sulfate 10 mg (5 mg x 2A)
  - ✓ Ketorolac 30 mg (1A)
  - ✓ Epinephrine 300 microgram (1:1000, 0.3 cc)
  - ✓ Cefuroxime 750 mg (cefuroxime 1 vial)
  - ✓ Add saline to make 100 cc



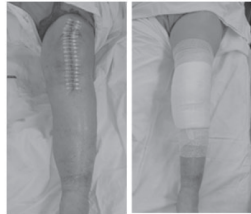
### Intraoperative Period (con't)

- ❖ Diluted BTB soaking
  - ✓ 0.35% BTB (17.5cc BTB + 500cc warm saline)
  - ✓ Soaking for 3 min before closure



### Intraoperative Period (con't)

- ❖ Capsular closure
- ❖ IA TXA (1.5g + N/S 20 cc)
- ❖ No (95%) or subcut. closed suction drainage
- ❖ Light dressing without cotton or splint
  - ✓ Allow immediate motion
  - ✓ Maximize effect of ice packs



*Thank You for Attention*



SESSION 1

### Post-operative Period (Op Date)

- ❖ Allow immediate upright position on the bed
- ❖ Allow immediate fluid intake, if PONV(-)
- ❖ Quit IV fluid
- ❖ Provide regular meal (dinner)
- ❖ Allow knee motion & limited ambulation (to toilet)

### Post-operative Period (con't)

- ❖ Dexamethasone 10 mg (7A) & 5 mg (7P) iv at PO#1
- ❖ Oral pain killers without IV PCA & Rofenecol opioid
  - ✓ Celecoxib 200mg qd, Pregabalin 75mg qd hs
  - ✓ AAP 650mg tid, prn) Tridol 100mg/2ml IV
- ❖ GI & other medication
  - ✓ MgO 1T tid, PPI qd, entelon 150mg bid
- ❖ Quit Antibiotics < 24h
- ❖ If used, remove drain POD#1 morning
- ❖ Intermittent O<sub>2</sub> 2L nasal prong for 48H
- ❖ Self ROM & strengthening exercise as tolerated
- ❖ Unlimited walking, only ADL education by therapist
- ❖ Back home at POD 5-6D

### Take Home Message

- ❖ Application of ERAS protocol will dramatically improve the condition of your patient after TKA.
- ❖ However, just a set order would never make such a change: multiprofessional, multidisciplinary team approach is the key to success.
- ❖ Building ERAS protocol takes a lot of time, effort, and patience: should be developed step by step.



## Antonio TANCHULING, M.D.

- Orthopedic Surgeon, St. Luke's Medical Center, Quezon City and Global City, Philippines

### MEMBERSHIP & POSITION

- Philippine Board of Orthopaedics, Inc.
- Philippine Orthopaedic Association
- Philippine Hip and Knee Society
- International Affiliate, American Academy of Orthopedic Surgeons
- International Affiliate, SICOT
- Founding Member, ASEAN Arthroplasty Association (AAA)

### RESEARCH INTERESTS

Osteoporosis, Total Joint Replacement, Geriatric Hip Fractures-Replacement and Fixation

Knee reconstruction after periprosthetic joint infection (PJI) is a difficult procedure. It needs thorough preparation that includes comprehensive preoperative planning. Part of this is the surgical plan or the blue print of the surgical approach and tactic. This is presumed that the infection has been fully controlled as indicated by the laboratory and clinical parameters.

Physical examination is done thoroughly. This helps in the initial evaluation of the integrity of the collateral ligaments and extensor tendons. The proper use of implants will be based on this examination. Either a constrained or hinged-knee implant construct will be indicated for the case depending on the physical examination. The weight bearing radiographs of both knees are useful and this gives adequate information regarding bony structural integrity. The use of intramedullary stems, augments and additional metallic construct such as tantalum for metaphyseal defects can be prepared based on the initial radiographic evaluation. The overlying skin or scar tissue is evaluated. Soft tissue coverage should be healthy and can be used to close the operative wound. Plan the operative incision well by knowing the integrity of the scar tissue especially in the multiply incised scarred knee.

There are various knee implants available for the reconstruction of the knee after the infection is controlled. The most common is the posterior stabilized condylar design which offers stability after a repeated knee surgery. Semi-constrained implants are used together with femoral and or tibial stems for added stability. These are used with bone cement. Hinged knee implants are used for those with incompetent collateral ligaments. Extensor tendons can be repaired and can be used with these various implants as well.



## Reconstruction after Knee PJI: The Undaunted Task

Autogenous or allogeneous bone grafts can be used to manage bone defects, whether structurally or for contained defects. Allograft-prosthesis composite (APC) can be used for massive bone defects where bulk implants are not available. They have good survival especially in the moderately active elderly patients.

Overall survival rate after 5 years has been reported at 80-90% for this group of patients who had knee reconstruction after PJI. The goal is to achieve pain-free knee, functional and one with a lifetime survival.

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Each Step We Care



## Jean-Yves JENNY, M.D.

- Senior consultant, University Hospital Strasbourg
- Former Associate Professor at Strasbourg University, Orthopedic and Trauma Surgery

### INSTITUTION AND POSITION

- Current position (since February 1, 2019) : Senior consultant, University Hospital Strasbourg, Department "Locomax" – Chief of staff: Professor F.BONNOMET
- September 1, 2014 to September 30, 2018 : Associated Professor of the University of Strasbourg

### EXPERIENCE

- August 1, 2007 to January 31, 2019 : Senior consultant, University Hospital Strasbourg, Center for Orthopedic and Hand Surgery of Strasbourg (CCOM) – Chief of Staff: Professor J.F.KEMPF
- June 1, 1996 to July 31, 2007 : Senior consultant – Chief of the Department of Knee Surgery and Sport Medicine – Senior Consultant at the Department for Septic Orthopedic Surgery, Center for Traumatology and Orthopedic Surgery of Strasbourg – Chief of Staff : Pr I.KEMPF followed by Pr. P.KEHR

Total knee arthroplasty (TKA) is a common and effective surgical procedure for treating end-stage knee arthritis. In recent years, technological advancements have introduced navigation systems as valuable tools to enhance the precision and accuracy of TKA procedures. The rationale for using navigation systems in TKA includes the following key points.

Navigation systems provide real-time, intraoperative feedback to the surgeon, enabling precise alignment and placement of prosthetic components. This accuracy is crucial for optimizing joint mechanics, which can lead to better functional outcomes and long-term implant survivorship. Navigation systems enable surgeons to achieve the desired alignment with high levels of accuracy, reducing the risk of malalignment-related complications.

Achieving a balanced soft tissue envelope is crucial for proper knee function and implant stability.

Navigation systems help surgeons assess and adjust ligament tension with calibrated measurements, leading to improved joint kinematics and better outcomes.

Every patient's anatomy is unique, and navigation systems allow for a more personalized surgical approach. By considering factors such as bone morphology, joint laxity, and soft tissue tension, navigation systems assist in tailoring the procedure to the patient's specific needs, instead of using the conventional routine "one fits all" policy.

Navigation systems provide real-time feedback and guidance to both experienced and less-experienced surgeons. This can boost surgeon confidence, particularly for those less familiar

## Why Still to Use Navigation during Total Knee Arthroplasty?

with TKA or those looking to refine their techniques. Navigation systems provide quantifiable data on alignment, component position, and soft tissue balance. This data can be used for postoperative assessment and research, contributing to a deeper understanding of surgical outcomes and potential areas fo improvement.

As technology continues to evolve, navigation systems have the potential to further advance the field of orthopedic surgery and improve the long-term success of TKA procedures, especially in association with robotic technology.

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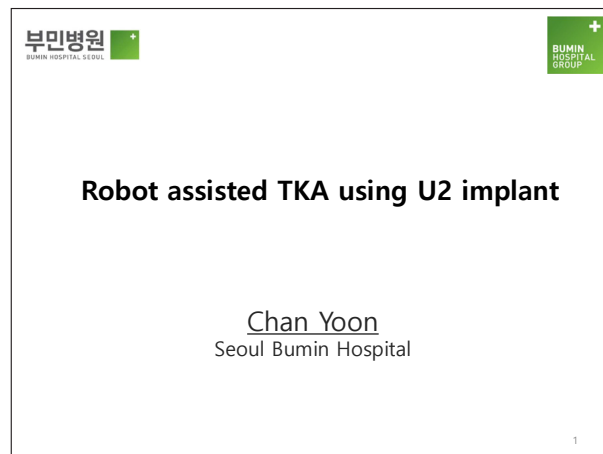
## Chan YOON, M.D.

- Educational Certified Orthopaedic Surgeon, Department of Orthopaedic Surgery, Seoul Bumin Hospital, Seoul, Korea
- CEO, EverEx Co.

### WORK EXPERIENCE

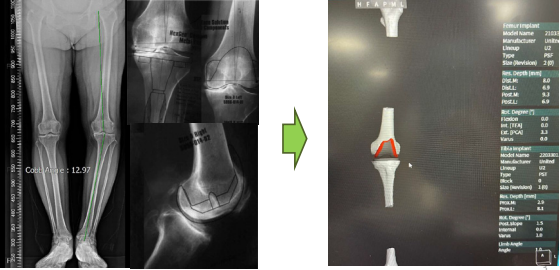
- 2019 – current EverEx Co. – CEO
- 2018 – current Beplus lab – Chief Medical Officer (2018 – 2019), Medical Advisor (2020 – current)
- 2018 – current Seoul Bumin Hospital – Staff of Orthopaedic department, Chief of Clinical Research Center (2018 – 2020), Research Director of Clinical Research Center (2020 – current), Educational Certified Orthopaedic Surgeon (2021 – current)
- 2017 – 2018 Seoul National University Seoul Metropolitan Boramae Hospital, Department of Orthopedic Surgery, Knee subdivision – Clinical Fellow
- 2013 – 2017 Seoul National University Hospital, Department of Orthopedic Surgery – Resident
- 2012 – 2013 Seoul National University Hospital – Intern
- 2009 – 2012 Public Health Center of Hwasung – Public Health Doctor

## Robot Assisted Total Knee Arthroplasty Using U2 Implant



### Advantages of robot assisted TKA

- 1) 3D Preoperative planning
  - Reduce error related to 2D x-ray image



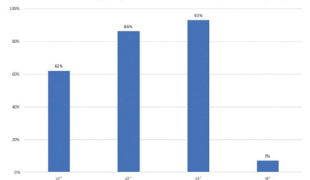
### Advantages of robot assisted TKA

- 2) Intraoperative navigation
  - More accurate bone cutting

#### CT Validation of Intraoperative Implant Position and Knee Alignment as Determined by the MAKO Total Knee Arthroplasty System

(J Knee Surg 2020)

James D. Sires, BMedSci, MD<sup>1</sup> Christopher J. Wilson, MB, ChB, MRCS, FRCS, TR&ORTH (Glas), FRACS<sup>2</sup>



**Average Error < 1.29°**

### Advantages of robot assisted TKA

- 1) 3D Preoperative planning
  - More accurate prediction of implant Size

#### Preoperative CT-Based Three-Dimensional Templating in Robot-Assisted Total Knee Arthroplasty More Accurately Predicts Implant Sizes than Two-Dimensional Templating

J. R. T. Pietrzak, MBBCh, FC Orth<sup>1</sup> E. E. Rowan, MD, FRCS<sup>1</sup> B. Kayani, BSc, MRCS, MBBS<sup>1</sup> M. J. Donaldson, BSc, MBBS<sup>1</sup> S. S. Huq, MBBS, MSc, MRCS<sup>1</sup> F. S. Haddad, BSc, MD, FRCS<sup>1</sup> (J Knee Surg 2019)

	2D templating	3D templating	P-value
<b>Femur</b>	52.9%	96.6%	P < 0.001
<b>Tibia</b>	28.7%	93.1%	P < 0.001

### Advantages of robot assisted TKA

- 2) Intraoperative navigation
  - More accurate bone cutting

#### Better accuracy and reproducibility of a new robotically-assisted system for total knee arthroplasty compared to conventional instrumentation: a cadaveric study

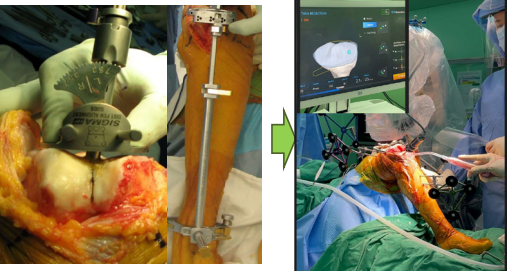
Ari Seidenstein<sup>1,2,3</sup> Miles Birmingham<sup>4</sup> Jared Foran<sup>5</sup> Steven Ogden<sup>6,7</sup> (KSSTA 2020)

	Manual TKA	Robot assisted	P-value
<b>Bone cutting error (mm)</b>	0.1 - 6.7mm	0.0 - 2.5mm	P < 0.05
<b>Bone cutting error (°)</b>	0.0 - 7.8°	0.0 - 3.4°	P < 0.05

**Reduced error compared to conventional TKA**

### Advantages of robot assisted TKA

- 2) Intraoperative navigation
  - More accurate bone cutting

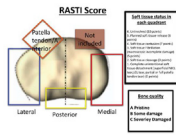


### Advantages of robot assisted TKA

- 3) Less iatrogenic tissue damage
  - No IM nailing
  - Less bone and soft tissue trauma

#### Iatrogenic Bone and Soft Tissue Trauma in Robotic-Arm Assisted Total Knee Arthroplasty Compared With Conventional Jig-Based Total Knee Arthroplasty: A Prospective Cohort Study and Validation of a New Classification System

Babar Kayani, MRCS, MBBS, BSc (Hons)<sup>a, b, \*</sup> (J Arthroplasty 2018)

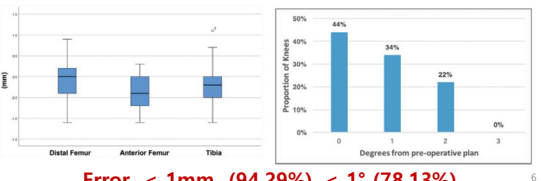


### Advantages of robot assisted TKA

- 2) Intraoperative navigation
  - More accurate bone cutting

#### Accuracy of Bone Resection in MAKO Total Knee Robotic-Assisted Surgery

James D. Sires, BMedSci<sup>1</sup> Johnathan D. Craik, BSc, MbChB, MSc, FRCS, TR&ORTH<sup>2</sup> Christopher J. Wilson, MB, ChB, MRCS, FRCS, TR&ORTH, FRACS<sup>2</sup> (J Knee Surg 2019)



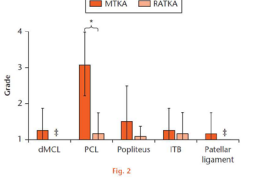
**Error < 1mm (94.29%), < 1° (78.13%)**

### Advantages of robot assisted TKA

- 3) Less iatrogenic tissue damage
  - No IM nailing
  - Less bone and soft tissue trauma

#### Less iatrogenic soft-tissue damage utilizing robotic-assisted total knee arthroplasty when compared with a manual approach

A BLINDED ASSESSMENT (Bone Joint Res 2019)



### Advantages of robot assisted TKA


- 4) Enhanced postsurgical recovery
  - Reduced blood loss
  - Reduced pain & narcotic medication use
  - Early functional recovery, reduced hospital stay
  - Improved patient satisfaction

**■ KNEE**  
**Robotic-arm assisted total knee arthroplasty is associated with improved early functional recovery and reduced time to hospital discharge compared with conventional jig-based total knee arthroplasty**  
A PROSPECTIVE COHORT STUDY  
 (Bone Joint J 2018)

**Improved Patient Satisfaction Following Robotic-Assisted Total Knee Arthroplasty**  
Austin S. Smith, MD<sup>1</sup>, Christian J. Eccles, MD<sup>2</sup>, Samrath J. Bhimani, MD<sup>3</sup>, Kevin M. Donnelly, MD<sup>4</sup>, Rohit B. Bhargava, BA<sup>5</sup>, Langen S. Smith, BS<sup>6</sup>, Arthur L. Makkar, MD<sup>6\*</sup>  
 (J Knee Surg 2019)

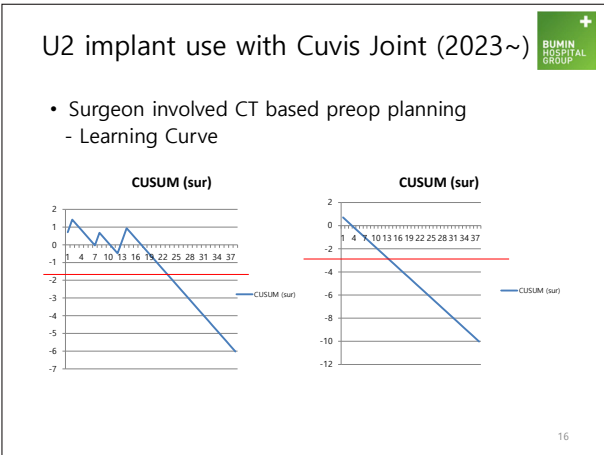
### U2 implant use with Cuvix Joint (2023~)

- Surgeon involved CT based preop planning
- 3D determined anatomic landmark by surgeon




### Current TKA robots available in market

Name	Manufacturer Introduction	Platform	Indication	Type	Technique	Image
Cuvix	Curexo, 2021 Korea	Open	TKA	Active	Burring	CT
ROSA	Zimmer, 2018 US	Closed	TKA	Active	Cutting guide	XR
Mako	Stryker, 2005 US	Closed	UKA PFA TKA THA	Semi-active	Saw burr	CT
Navio	S & N, 2012 US	Closed	UKA PFA TKA	Semi-active	Burring	Image Free



### Cuvix Joint (2021~, Curexo)

- **3 Characteristics of Cuvix Joint**
  - Open system
  - Fully active bone cutting (Burr)
  - Surgeon involved CT based preop planning




### U2 implant use with Cuvix Joint (2023~)

- Fully active robot arm



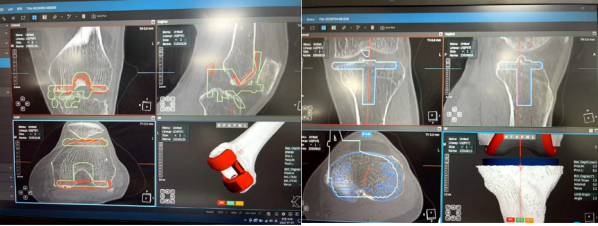
### U2 implant use with Cuvix Joint (2023~)

- Surgeon involved CT based preop planning
- **Axial CT scanning** of the hip, knee, and ankle regions (1mm cut, 10cm range from joint center)
- **Education:** Curexo Institute Course for preoperative planning using specialized software program (**Jplanner**)



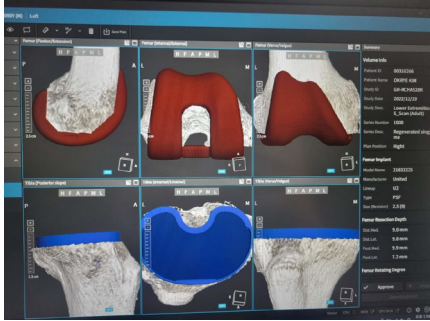
### My procedure – U2 Robotic TKA

Preoperative planning



### My procedure – U2 Robotic TKA


Preoperative planning



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### My procedure – U2 Robotic TKA


Intraoperative procedure



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### My procedure – U2 Robotic TKA


Intraoperative procedure



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### My procedure – U2 Robotic TKA


Intraoperative procedure



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### My procedure – U2 Robotic TKA

Intraoperative procedure




Left Knee		Right Knee	
Internal G.O.	Varus G.O.	Internal G.O.	Varus G.O.
8.0	5.5	9.7	7.3
8	8	9	8
3.7	5.0	3.7	5.0
7°	0°	86°	3°

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### My procedure – U2 Robotic TKA


Intraoperative procedure



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### My procedure – U2 Robotic TKA

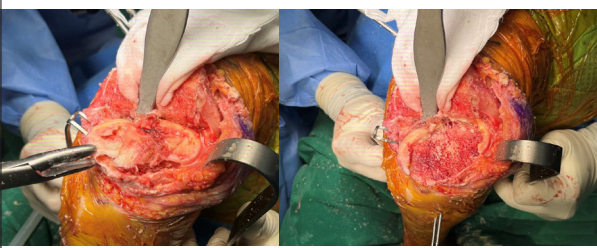
Intraoperative procedure



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### My procedure – U2 Robotic TKA

Intraoperative procedure




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## My procedure – U2 Robotic TKA

**BUMIN HOSPITAL GROUP**

Intraoperative procedure



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## Take-Home Message

**BUMIN HOSPITAL GROUP**

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### Patient Satisfaction after Total Knee Arthroplasty

Young-Joon Choi, MD and Ho Jong Ra, MD  
Department of Orthopedic Surgery, Gangneung Asan Hospital, Ulsan University College of Medicine, Gangneung, Korea

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### Transitioning a Practice to Robotic Total Knee Arthroplasty Is Correlated with Favorable Short-Term Clinical Outcomes—A Single Surgeon Experience

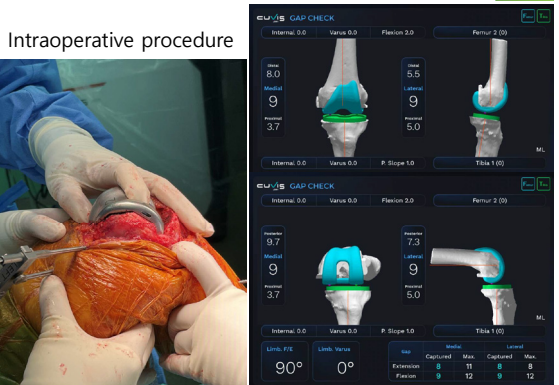
Connor A. King, MD<sup>1</sup> Mark Jordan, MD<sup>2</sup> Alexander T. Bradley, MD<sup>1</sup> Caroline Wlodarski, BS<sup>2</sup>  
Alexander Tauchen, MD<sup>2</sup> Lalit Puri, MD<sup>2</sup>  
(J Knee Surg 2020)

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## My procedure – U2 Robotic TKA

**BUMIN HOSPITAL GROUP**

Intraoperative procedure



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**CHAN YOON**  
yoon,chan,alex@gmail.com

Linked in



*Thank you  
for your attention!*



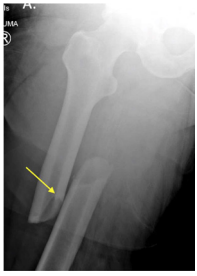
**BUMIN HOSPITAL GROUP**

**부민병원**  
BUMIN HOSPITAL, KOREA

## Limitations

**BUMIN HOSPITAL GROUP**

- Periprosthetic Fractures Through Tracking Pin Sites – incidence 0.06% to 4.8%.



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## Limitations

**BUMIN HOSPITAL GROUP**

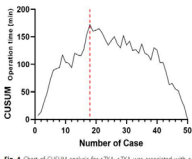
- Increased time durations for surgery

Jung et al. BMC Musculoskeletal Disorders (2020) 21:122  
https://doi.org/10.1186/s12913-020-05262-6

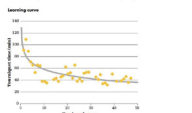
**RESEARCH** **Open Access**

Learning curve of robot-assisted total knee arthroplasty and its effects on implant position in asian patients: a prospective study

Ho Jung Jung<sup>1</sup>, Min Wook Kang<sup>1</sup>, Jong Hee Lee<sup>1</sup> and Joongil Kim<sup>1\*</sup>



**Fig. 4** Chart of CUSUM analysis for TKA. TKA was associated with a learning curve for operation time in 18 cases. CUSUM cumulative summation in TKA, robot-assisted total knee arthroplasty



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Each Step We Care



## Tzai-Chiu YU, M.D.

- Chairman, R&D Center of joint reconstruction, Tzu-chi Medical center, TAIWAN
- Visiting professor, Department of joint surgery, Jiao-Toung University, Xian, CHINA

### EDUCATION

Bachelor of Medicine, National Taiwan University, 1984

### PROFESSIONAL APPOINTMENTS

- 2013-Now Visiting professor, Department of joint surgery, Jiao-Toung University, Xian
- 2011-Now Director, R and D Center of joint reconstruction, Tzu-chi Medical Center
- 1995-2011 Chairman, Department of Orthopedics, Tzu-Chi Medical Center
- 2002-Now Clinical Professor, Tzu-Chi University, College of Medicine
- 1995-2000 Lecturer, Tzu-Chi Medical Collage
- 1990-1995 Attending Physician, Tzu-Chi General Hospital
- 1985-1990 Residency, National Taiwan University Hospital

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# Pearls for Improvement of Function after TKA - Different Tools? or Different Concepts?

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### HONOR

- 2014-Now Council member, orthopedic association, ROC
- 2013-Now Editor board member, Journal of orthopedic surgery, COA
- 2011-2013 President, Taiwan Spine Society
- 2008-2010 President, Joint Reconstruction Association, ROC
- 2008-Now Council member, TheNational Science and Technology Program for Biotechnology, National Science Council
- 2003-Now Secretary General, Orthopaedic Research Society, ROC
- 2002-Now Board Member, Spinal Association, ROC
- 2002 Award of International Biotechnology and Medical Care Innovation
- 2000-Now Board Member, Joint Reconstruction Association, ROC
- 2000-Now Board Member, Arthroscopic & Knee Association, ROC
- 1998-Now Editor Journal of Orthopaedic Surgery, ROC

Each Step We Care



**MODERATOR**

**Chong Bum CHANG, M.D.**

- Professor with Tenure, Department of Orthopaedic Surgery, Seoul National University College of Medicine, Seoul National University Bundang Hospital
- Chairman, Department of Orthopedic Surgery, Chairman, Joint Reconstruction Center, Seoul National University Bundang Hospital

**EDUCATION**

- PhD (2006) Orthopedics & Tissue engineering, Seoul National University College of Medicine (Thesis title: Surface markers of synovial cell for chondrogenesis)

**COMMITTEE APPOINTMENT**

2023 – present

- Editorial Board, J. arthroplasty

2020 – present

- Chairman, Insurance and Policy Committee, Korean Knee Society
- Chairman, Insurance and Policy Committee, Korean Arthroscopy Society
- Vice chairman, Academic Committee, Korean Knee Society
- Board member, National Examination Committee, Korean Orthopaedic Association
- Board member, Insurance and Policy Committee, Korean Orthopaedic Association

## SESSION 2 THE KNEE



## MODERATOR

## Mohd Shahrul AZUAN, M.D.

- DEPT OF ORTHOPAEDIC, HOSPITAL TENGKU AMPUAN  
RAHIMAH, SELANGOR

**Profession**

- ORTHOPAEDIC CONSULTANT
- ARTHROPLASTY SURGERY

**Registration History**

- Malaysian Medical Council:  
- Registration number: 39400.
- National Specialist Registrar:  
- NSR number: 132983.

**Academic Qualifications:*****Tertiary Qualifications:***

- Matriculation of Science, National University of Malaysia (UKM): Year 1996/1997
- Medical Degree (MD) , National University of Malaysia (UKM): Year 1997 2002
- Master in Orthopaedic (MS Ortho), UKM, National University of Malaysia (UKM): Year 2008 - 2012
- Subspecialty in Arthroplasty (Ministry of Health):  
Year 2017 - 2021
- Clinical Research and Fellowship Knee Surgery & Sports Medicine (Seoul National University Hospital): 2019

***Subspecialty / Fellowship Training:***

- Subspecialty in Arthroplasty: 2017 to 2021 -  
Ministry of Health (MOH), Malaysia
- Clinical Research and Fellowship Knee Surgery & Sports Medicine, Seoul National University Hospital (SNUH) - 2019



## Oriol PUJOL ALARCÓN, M.D.

- Knee Unit Surgeon at Hospital Vall d'Hebron,  
Barcelona Hospital, Spain

### EDUCATION

- 2011 – 2017 : Degree in Medicine at Hospital Clínic, University of Barcelona (Spain).
- 2019 : Master in Clinical Medicine at University Camilo José Cela.
- 2023 : "Introduction SPSS statistical analysis" (30 hours). COMB-IFMIL.
- 2023 : "Research Course". Global Health Training Centre - Oxford University.
- 2023 – 2024 : Post-Specialized Health Training Scholarship "Dr. Carles Margarit", awarded by the Hospital Vall Hebron Foundation.

### PROFESSIONAL EXPERIENCE

- 2018 – 2023 : Trauma and Orthopedic Surgery Residency at Hospital Vall Hebron, University Autònoma of Barcelona (Spain).
- 2021 – present : Knee Unit surgeon at iMove – Clínica Mi Tres Torres (Barcelona, Spain). Fellowship in robotic assisted total knee arthroplasty with Dr Joan Leal.
- 2023 – present : Knee Unit surgeon at Hospital Vall Hebron (Barcelona, Spain).

Total knee arthroplasty (TKA) is an effective and well-established treatment for patients with symptomatic end-stage knee osteoarthritis. However, up to 20% of patients still remain dissatisfied after this procedure. On the other hand, Bellemans et al. noted that only 15% of population presented a neutral axis with a neutral joint line obliquity (JLO), which is the target of the systematic mechanical alignment. These observations have led to the development of a more individualized approach to TKA.

Functional alignment is a personalized philosophy popularized by Lustig et al. that aims to reconstruct patient constitutional alignment and JLO while balancing the joint. To get these targets, component positioning and implant sizing are precisely adjusted (within set limits) using new robotic technologies. Robotic assisted TKA (RATKA) has come with the aim of improving the quantification, control and accuracy of implant positioning, limb alignment and soft tissue balancing. Therefore, the arthroplasty can be better tailored to patient's individual anatomy hoping to achieve a successful TKA and a satisfied patient.

## **Functional Alignment in Robotic Assisted Total Knee Athroplasty**

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Each Step We Care



## Kui-Chou HUANG, M.D.

- Deputy Superintendent, Chairmen of Orthopaedic Department, Asia University Hospital, Taiwan

### WORK EXPERIENCE

- Surgical resident, Taichung Veterans General hospital (1985-1988)
- Chief resident, Taichung Veterans General hospital (1988-1989)
- Orthopaedic attending, Taichung Veterans General hospital (1989-1990)
- Chief of orthopaedic department, Puli Veterans hospital (1991-1997)
- Chief of orthopaedic department, Chu Shang Show Chwan Hospital (1997-1999)
- Orthopaedic attending, Taichung Veterans General hospital (1999-2005)
- Deputy superintendent, Puli Veterans hospital (2005-2008)
- Deputy chairman Education Department, Taichung Veterans General Hospital (2009-2012)
- Chairman of orthopaedic department, Taichung Veterans General hospital (2009~ 2016)
- Deputy superintendent, Asia University Hospital (2016- now)
- President, Joint reconstruction society, ROC (2018-Nov.~2020 Nov.)

Total knee arthroplasty is the surgical choice for end stage osteoarthritis of the knee. Although, we have a very good long-term results, but still 20-25% is not satisfied with the clinical outcome. Recent Kinematically aligned total knee arthroplasty get a good short-term to mid-term clinical outcome and higher patient satisfaction rate. But a lot of debate still is going. Recent precision medicine with the help of navigation or robotic total knee arthroplasty arouse the issue about getting better clinical outcome. More cost, and with no difference in clinical outcome arouse the question about cost-benefit debate. Recent, DR. MacDessi SJ et al, publish the new CPAK classification for the coronal alignment of the knee. The CPAK system make us easy to understand and applied in clinical use. We can use the classification to set different cutting target goal for different phenotype of knee. No violation of the intramedullary canal of the femur canal can reduce bleeding, decrease the incidence of pulmonary embolism and inflammatory response have been proved by using navigation or robotic surgery. So, in this talk we will show you how to combine the modified CPAK classification, Gap technique and EM device for distal femur cut to do a personalized total knee arthroplasty. We will demonstrate the surgical planning, tip and pearls for the surgery. Case illustration will also demonstrate in severe bowing varus knee and valgus knee.



# Phenotype Oriented Gap Technique Total Knee arthroplasty with EM device - Surgical tip and pearls and case illustration

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Each Step We Care



## Paul LEE, M.D., Ph.D.

- Visiting Professor, Sports Medicine, the University of Lincoln, United Kingdom
- Surgeon, the Keep Clinc, United Kingdom

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Dr. Paul Lee, Consultant Orthopedic Surgeon, and Double Visiting Professor of Sports Medicine and Medical Engineering, holds a PhD in Medical Engineering, MSc in Sports Medicine, and various surgical fellowships. He's an esteemed medical doctor and engineer, applying engineering principles to musculoskeletal medicine.

With a PhD in medical Cell Engineering and surgical fellowships in Regenerative Medicine. Prof Lee is an internationally recognized medicine, he was awarded ICRS teaching center of excellence. He practices at the London Cartilage Clinic and 108 Harley Street as a regenerative medicine expert, and specializes in minimally invasive surgery, including ACL and hip/knee replacements.

Within the Gilmore's Groin team at the London Sports Injury Clinic, Prof. Lee, in collaboration with Mr. Simon Marsh, linked Oestitis Pubis, Gilmore's groin and adductor pathology to the A.S.I.A. syndrome and developed successful treatments. He's a regional surgical advisor for the Royal College of Surgeons of Edinburgh and is actively engaged in medical teaching.

# Custom Kinematic Rotation Alignment in Knee Replacement, the MBC

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Prof. Lee leverages digital technology, AI, and deep learning in musculoskeletal regenerative medicine, serving as the medical director of MSK Doctors. He established the ENRICH-MSK partnership and MSK-AI motion lab, securing national funding awards, including Innovate UK, for research. With 100+ research publications and 1000+ citations, he's a pioneering figure in the field.

- 2005 / MBBch / Undergraduate Cardiff University
- 2011 / MSc / Postgraduate (Sports and exercise Medicine) UWIC
- 2014 / PhD / Postgraduate (Medical Engineering) Cardiff University
- 2014 / FEBOT / Fellowship European Board of Orthopaedic Trauma
- 2015 / FRCS (T&O) / Fellowship Royal college of Surgeons of Edinburgh
- 2015-2016 / BOA / Management Clinical Leadership Fellow
- 2016 / CCT / GMC Trauma and Orthopaedic surgery
- 2016-2017 / Health Foundation, Q NHS / Management Clinical Entrepreneur Fellow, Community Member, Quality Improvement
- Since 2017 / Consultant Orthopaedic Surgeon / NHS England
- Since 2018 / Harley Street Consultant / Harley Street, London Sports Injuries Clinic, London Cartilage Clinic, MSK Doctors
- Since 2018 / Medical Director / MSK Doctors The Keep Clinic, MSK House, OPEN MRI

SESSION 2



## Takashi SATO, M.D., Ph.D.

- Vice President, Niigata Medical Center, Japan
- Director, Department of Orthopaedic Surgery, Niigata Medical Center, Japan
- Vice clinical professor, Niigata University School of Medicine, Japan

### SPECIALTY

- Knee Surgery (total joint and sports medicine)
- Trauma Surgery (especially in knee and hip)

### PREVIOUS PROFESSIONAL POSITIONS

Clinical :

- 1994 – 1995, Department of Orthopaedic Surgery, Niigata University Hospital
- 1995 – 1996, Department of Orthopaedic Surgery, Akita Red Cross Hospital
- 1996 – 1998, Department of Orthopaedic Surgery, Shimotsuga General Hospital
- 1998 – 1999, Department of Orthopaedic Surgery, Hennepin County Medical Center, Minneapolis, USA
- 1999 – 2001, Department of Orthopaedic Surgery, Shimotsuga General Hospital
- 2001 – 2001, Department of Orthopaedic Surgery, Tsubame Rosai Hospital
- 2001 – present, Department of Orthopaedic Surgery, Niigata Medical Center

### Background

Several previous studies using conventional TKA implants reported that excessive intraoperative final joint laxity (FJL) deteriorates postoperative clinical outcomes. We hypothesized that the impacts of the FJL on the clinical outcomes in medial pivot (MP) TKA are different from that in conventional TKAs.

### Patient and Methods

104 MP TKAs were investigated. Intraoperative medial and lateral final joint laxity (MFJL and LFJL) in knee extension and 90-degree flexion were calculated according to the previously reported method. The relationships between these FJLs and clinical variables (2011 KSS, range of motion, subjective feeling of knee instability) were statistically examined.

### Results

On average, the FJL was smaller in medial than lateral, and smaller in extension than in flexion. The excellent clinical outcomes were achieved but there were no significant correlations between FJLs and clinical outcomes in this series. Conclusion: The impacts of the FJL on the clinical outcomes are different from that in other conventional TKAs. On the condition of the FJL pattern of smaller medial than lateral, high patient satisfaction and joint stability can likely be achieved, not being affected by the magnitudes of FJLs.

## Relationship between Joint Laxity and Clinical Outcomes in MP TKA

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Academic research :

- 1998 – 1999, Department of Orthopaedic Surgery, Hennepin County Medical Center Minneapolis, MN

### PUBLICATION

- Sato T, Omori G, Koga Y, et al: Three-dimensional lower extremity alignment assessment system. Application to evaluation of component position after total knee arthroplasty. *J arthroplasty*, 19: 620 -628, 2004.
- Sato T, Koga Y, Sobue T, et al: Quantitative Three-Dimensional Analysis of Preoperative and Postoperative Joint Line in Total Knee Arthroplasty. A New Concept for Evaluation of Component Alignment. *J Arthroplasty*, 22: 560 -568, 2007
- Sato T, Mochizuki T: Functionally oriented alignment of the lower extremity reflecting the direction of gait for healthy elderly, knee osteoarthritis, and total knee arthroplasty subjects. *J Med Biol Eng*. Published online: 29 September 2020.
- Sato T and Mochizuki T, Three-dimensional morphology of the distal femur based on surgical epicondylar axis in the normal elderly population. *The Knee*, 30: 125-133, 2021.



## Eiichi NAKAMURA, M.D., Ph.D.

- Assistant Director and Clinical consultant, Kumamoto Kaiseikai Hospital

- Lecturer, Department of Orthopaedic Surgery, Kumamoto University Hospital

### SPECIALTY

Surgery of the knee and ankle, Sports medicine for the knee, Bone lengthening

### MEMBERSHIPS

- Japanese Orthopaedic Association
- ISAKOS (International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine); Active member
- ESSKA (European Society for Sports Traumatology, Knee Surgery and Arthroscopy)
- Japanese Knee Society; Councilor
- Japanese Sports Orthopaedic Association; Councilor
- Japanese Society for Replacement Arthroplasty
- Japanese Society for Surgery of the Foot; Councilor
- Japanese Society of Clinical Sports Medicine
- Japanese Society for Joint Diseases
- Japanese Association of External Fixation and Limb Lengthening
- Japanese Association of Rehabilitation Medicine
- Japanese Society for Musculo-skeletal Rehabilitation
- West-Japanese Society of Orthopaedics & Traumatology

### Background

Total Knee Arthroplasty (TKA) stands as the leading surgical treatment for severe knee osteoarthritis. A healthy knee showcases, as increase of flexion, a posterior slide of the lateral femoral condyle on the tibial plateau and a pivot on the medial segment. The ambition for TKA implant design is to mimic these natural knee movements. Unfortunately, conventional prostheses sometimes fall short of reproducing the native knee's kinematics, leaving roughly 20% of TKA recipients unsatisfied. Several innovative TKA designs have recently emerged aiming to reproduce the knee's medial pivoting. Yet, it remains unclear whether these designs can consistently mimic desired kinematics in daily life activities. This study sought to analyze the in vivo kinematics of patients with TKA during weight-bearing activities using the newer medial-pivot (MP) and posterior-stabilized (PS) designs. We postulated that the MP design would more closely replicate natural medial pivoting.

### Patients and Methods

This prospective randomized controlled trial involved 36 TKA recipients, with each group comprising 18 knees, and monitored them for at least a year. Under the same condition of a constant intraoperative medial tight of soft tissue balance, one group is implanted with the CS-bearing MP TKA: EVOLUTION™ (MicroPort Orthopedics Inc.), while the other with the PS-fixed bearing PS TKA: Persona® (Zimmer Biomet). Outcome indicators encompassed the Knee Society Score (KSS) and the Knee Injury and Osteoarthritis Outcome Score (KOOS). Kinematic evaluations were performed during lunge and step-up activities. A 2D-to-3D registration

## A Prospective Randomized Controlled Trial Comparing in Vivo Kinematics during Weight-Bearing Activities in Medial-Pivot versus Posterior-Stabilized Total Knee Arthroplasty

technique ascertained the lateral and medial femoral condyles' anteroposterior translation and the tibiofemoral axial rotation.

### Results

Postoperatively, all patients had pain relief and well-functioning knee in daily life. There was no statistically significant difference between the two groups in terms of postoperative implant positioning, femoro-tibial alignment, and both KSS and KOOS scores. Kinematic analysis revealed that with EVOLUTION™, the medial femoral condyle remained static, while the lateral one shifted posteriorly as the knee flexed. In contrast, Persona® displayed an unexpected anterior shift of the medial femoral condyle, accompanied by a lateral pivot. Both designs demonstrated an average tibial internal rotation of roughly 4° from extension to flexion. During lunge and step-up activities, 83% and 72% of the EVOLUTION™, respectively, exhibited a medial pivot pattern, in contrast to 22% and 11% in the Persona®.

### Conclusion

When flexing under weight-bearing conditions, knees with EVOLUTION™ MP knee arthroplasty demonstrated higher reproducibility of a medial pivot motion, with a stable anteroposterior contact position of the medial femoral condyle and a rollback of the lateral femoral condyle. Despite equivalent tibial internal rotation angles and clinical scores to the Persona®, in vivo kinematics of EVOLUTION™ align with the intended design concept. There are some limitations in the present study. First, this is a small sample's size study in postoperative early phase. Further studies with larger samples in longer follow-up period are needed.



**MODERATOR**

**Tzai-Chiu YU, M.D.**

- Chairman, R&D Center of joint reconstruction, Tzu-chi Medical center, TAIWAN
- Visiting professor, Department of joint surgery, Jiao-Toung University, Xian, CHINA

**EDUCATION**

Bachelor of Medicine, National Taiwan University, 1984

**PROFESSIONAL APPOINTMENTS**

- 2013-Now Visiting professor, Department of joint surgery, Jiao-Toung University, Xian
- 2011-Now Director, R and D Center of joint reconstruction, Tzu-chi Medical Center
- 1995-2011 Chairman, Department of Orthopedics, Tzu-Chi Medical Center
- 2002-Now Clinical Professor, Tzu-Chi University, College of Medicine
- 1995-2000 Lecturer, Tzu-Chi Medical Collage
- 1990-1995 Attending Physician, Tzu-Chi General Hospital
- 1985-1990 Residency, National Taiwan University Hospital
- 2011-2013 President, Taiwan Spine Society
- 2008-2010 President, Joint Reconstruction Association, ROC
- 2008-Now Council member, The National Science and Technology Program for Biotechnology, National Science Council
- 2003-Now Secretary General, Orthopaedic Research Society, ROC
- 2002-Now Board Member, Spinal Association, ROC
- 2002 Award of International Biotechnology and Medical Care Innovation
- 2000-Now Board Member, Joint Reconstruction Association, ROC
- 2000-Now Board Member, Arthroscopic & Knee Association, ROC
- 1998-Now Editor Journal of Orthopaedic Surgery, ROC

**HONOR**

- 2014-Now Council member, orthopedic association, ROC
- 2013-Now Editor board member, Journal of orthopedic surgery, COA



## SESSION 3 THE HIP



## MODERATOR

## Saúl MARTÍNEZ, M.D.

- Chairman, Orthopedic Service, Hospital Universitario Santa Clara, Bogota, Colombia
- Orthopaedic Surgeon, Centro medico Colmedica Medicina Prepagada, Bogota, Colombia

**Research**

- Registry Study Clinical follow up hip and knee prosthesis  
October 2013- Currently
- Multinational Multicenter Study Surgical Treatment hip fractures 2011- Currently

**EXPERIENCE**

- ORTHOPEDIC SURGEON : Hospital Universitario Santa Clara. Bogota. February 2002
- Chairman Orthopedic Service from July 2003 Currently
- Scientific Director CLEMI foundation Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2013-2015
- National Director Education and Training Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2012-2015
- Consultant Smith and Nephew USA 2014 Currently
- Consultant Waldemar Link Germany 2016 Currently

**Areas of Interest**

- Hip Reconstructive Surgery and Preservation
- Hip and Pelvis Trauma Surgery
- Fragility Fractures
- Complex Revision Hip
- Periprosthetic Fractures



## Ronald HILLOCK, M.D.

- Adult Joint Reconstruction Surgeon & Musculoskeletal Oncologist, Nevada Orthopedic & Spine Center, Las Vegas, Nevada

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Ronald W. Hillock, MD, joined Nevada Orthopedic & Spine Center in 2011 and sees patients at their office in Las Vegas, Nevada. Dr. Hillock is focused on the diagnosis and treatment of musculoskeletal disease and adult joint reconstruction surgery.

Dr. Hillock currently serves as Chief of Surgery at Centennial Hills Hospital and Medical Center in Las Vegas and on the Board of Directors of the Nevada State Orthopedic Society.

Dr. Hillock has served as the Chief of Surgery for the 67th Combat Support Hospital during Operation Iraqi Freedom and Chief of Orthopedic Surgery Rehabilitation Service at the U.S. Army Hospital in Heidelberg, Germany. He has also served as the chairman of the patient safety committee for the Loma Linda University Medical Center Orthopedic Hospital.

The clinical use of a proximal femur (PFR) mega-prosthesis in limb salvage surgery has been proven for the last 40 years. The original devices were custom built for each patient. Today a 4th generation of modular limb salvage prosthesis has been designed and created.

The new PFR can be used in many clinical settings beyond tradition tumor reconstruction. The presentation will review the various applications of the modern PFR to include oncologic primary and metastatic reconstructions, arthroplasty revision reconstruction, trauma and complex musculoskeletal infection management settings.

# Proximal Femur Mega-prosthesis, Design Philosophy and Clinical Applications

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### PUBLICATIONS

- Professionalism, Social Media, And The Orthopaedic Surgeon: What Do You Have On The Internet?  
American Academy of Orthopedic Surgeons Annual Meeting · Mar 1, 2016
- In Vitro Characterization of Lavage Splash and the Effectiveness of a Lavage Splash Shield  
Reconstruction Review · Mar 1, 2015
- Osseointegration Implant Post Coupling with external Prosthetic Limb  
Reconstruction Review · Jun 1, 2014
- Anesthesia and Pain Control for Osseointegration Implantation into the Femur  
Reconstruction Review · Sep 1, 2013

### TOP SKILLS

- Musculoskeletal Oncology
- Adult Reconstruction
- Fracture Care

SESSION 3

Each Step We Care



# Po-Kuei WU, M.D., Ph.D.

- Chief, Therapeutical and Research Center of Musculoskeletal Tumor, Taipei Veterans General Hospital, Taipei, Taiwan
- Chief, Division of Joint Reconstruction, Taipei Veterans General Hospital, Taipei, Taiwan

## CURRENT POSITIONS

- 2022 – Now, Chief, Joint Reconstruction, Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital
- 2017 – Now, Chief, Therapeutical and Research Center of Musculoskeletal Tumor, Taipei Veterans General Hospital
- 2022 – Now, Professor, National Yang Ming Chiao Tung University
- 2018 – Now, Chairman of the board, Taiwan Osteosarcoma Caring Association

## MEDICAL EXPERTISE

Bone tumor treatment, Soft tissue sarcoma treatment

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## Pedicle Freezing by Freezing Tank for Sarcoma of Limbs

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## Nilo PANER, M.D.

- Clinical Associate Professor of Orthopedics, University of the Philippines-Manila College of Medicine and Philippine General Hospital
- President, Philippine Hip and Knee Society

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### INTERESTS / EXPERTISE

Degenerative Joint Disease, Hip and Knee Arthroplasty (primary/revision) Arthroscopy (hip and knee), hip resurfacing, unicompartmental knee replacement, ACL reconstruction, Bone & Joint Infections, periprosthetic joint infection, fracture/orthopedic device related infections, Diabetic Foot Infections

### ACADEMIC APPOINTMENT

- 2009-present Clinical Associate Professor, University of the Philippines-Manila College of Medicine and Department of Orthopedics, Philippine General Hospital

### EXPERIENCE/ POSITIONS HELD

- 2023- President, Philippine Hip and Knee Society
- 2021-2022 Vice President, Philippine Hip and Knee Society
- 2018-present Country Delegate Committee member, European Bone and Joint Infection Society
- 2019-present Consultant, Trauma Division, Department of Orthopedics, Philippine General Hospital

## Catastrophic Failure of Femoral Head Due to Trunnionosis: A Case Report

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### RESEARCH / PUBLICATION

- 2018 Delayed onset bioabsorbable screw reaction, extrusion and Pseudomonas aeruginosa tibial tunnel osteomyelitis, years after arthroscopic Anterior Cruciate Ligament reconstruction: a report of 2 cases

Patricio E. Dumlao III, MD, Bryan Albert T. Lim, MD, Lyndon L. Bathan, MD, FPOA, Nilo Paner, MD, FPOA Poster Presentation, 37th Meeting of European Bone and Joint Infection Society, Helsinki, Finland BMJ Case Reports, Vol 12, Issue 9, 2019

- 2014 Outcomes of adult patients (>18 yrs old) who underwent debridement curettage and sequestrectomy and application of antibiotic beads for chronic osteomyelitis of long bones at Philippine General Hospital from 2004-2014

SESSION 3



## Nicolás RESTREPO, M.D.

- Orthopaedic Surgeon, University Hospital of Nariño  
Department, Colombia

### SPECIAL TRAININGS

- Hip Arthroplasty: Germany (Bad Rappenau)
- Minimal Invasive Surgery: Rush Presbyterian Hospital Chicago (Dr. Berger) & Johns Hopkins (Baltimore)

### EXPERIENCE

- President of the SCCOT (Colombian Orthopaedic Society) Hip & Knee Chapter. 2007-2009
- President Sociedad Colombiana de Ortopedia y Traumatología SCCOT (Colombian Orthopedic Society) 2009-2011

### INTRODUCTION

Developmental Dislocation of the Hip continue to be a frequent cause of Total Hip Arthroplasty for young people in our countries, even well-developed like Italy and Greece; nevertheless, the anatomic changes and length discrepancy represent a challenge for their descent to the original acetabulum.

In USA Subtrochanteric Osteotomy are the gold standard to perform this difficult operation, but always requiring a special stem designed to solve the metaphyseal subtrochanteric mismatch, once you resect 2 or more centimeters to place our cup at the right natural position

We perform a distal supracondylar Osteotomy since 1998 to perform this surgery, using different stems, even cemented stems.

### MATERIAL & METHODS

In this conference we will show our technique step by step, always descending our hips to the original paleo/acetabulum and then performing our femoral side as usually, utilizing different stems even short stems, obtaining excellent results, correcting limping, and length discrepancy.

1. Use your usual approach
2. Complete capsulectomy
3. Work the original acetabulum, using your thick posterior wall to widening it
4. Work your femur as usually with an adequate stem



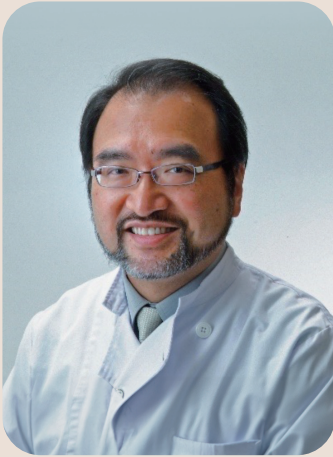
## Distal Femoral Supracondylar Osteotomy to Descend Inveterated Crowe 4 DDH Hips

5. Go distal and perform a supracondylar lateral distal approach
6. Make the osteotomy and reduce your hip doing traction
7. Give some traction to calculate your distal resection
8. Give a little varus (6 to 10°) to your cut to correct the residual valgus
9. Fix the osteotomy

Now, we have more than 350 Crowe 3 and 4 hips, treated with this kind of procedure, descending from 2,8 to 9,8 centimeters, leaving a final length discrepancy in average 1,2 CMS and correcting limping, pain and overall results.

### DISCUSSION

Performing a Total Hip Arthroplasty in Chronic untreated DDH patients is a real challenge; apart from dealing with severe anatomical changes and poor bone quality, if we perform a Subtrochanteric Osteotomy, in order to get good and long lasting fixation is mandatory to have small stems and special designs (SROM Type stems, conic fluted stems). To perform a Total Hip Arthroplasty with supracondylar Osteotomy, offers a well standardized technique, allows utilization of different types of stems, even short or cemented stems, facilitates length equalization, better gait correction and excellent long time results.



## Yoshitada HARADA, M.D., Ph.D.

- Advisor, Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital, Japan

### WORK EXPERIENCE

- 1982 – 1983 Resident of Orthopaedic Surgery, Chiba University Hospital, Department of Orthopaedic Surgery
- 1983 – 1984 Doctor of Orthopaedic Surgery, Chiba-City Hospital, Department of Orthopaedic Surgery
- 1984 – 1985 Doctor of Orthopaedic Surgery, Kimitsu Central Hospital, Department of Orthopaedic Surgery
- 1985 – 1986 Doctor of Orthopaedic Surgery, Narashino National Hospital, Department of Orthopaedic Surgery
- 2008 – 2023 President of Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital in Chiba
- 2023 – present Advisor of Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital in Chiba

### RESEARCH INTERESTS

- Pathogenesis of osteolysis after total joint replacement
- Recruitment of osteoclasts in pathologic conditions
- Biomaterials for total joint replacement
- Image analysis of CT and MRI in Hip disorders
- Development of prosthesis for the hip joint (plate system and THA)

There were many types of cementless stems with each concept until now. During 1980's, the concept of "fit and fill" was most important and we believed that. Afterwards, Zweymuller type and taper wedge type were introduced as new concepts and long-term clinical results were established. However, stress shielding should be concerned when stem revision were needed because of infection. Recently, curved short stem were developed for prevent of stress shielding but primary stability were concerned. In these studies, we clarified the indication and technical pitfalls of curved short stems for patients with hip disorders.

#### [Study 1 / Optimys stem] Materials and methods:

From May 2013, we performed cementless THA by the curved short stem (Optimys stem) for hip disorder. Two hundred and twenty hips of 189 patients were examined including 13 males and 176 females. Age at surgery was 62.1+11.0 years old in average. Surgical approach was used modified Watson-Jones in all hips. Clinical evaluation was used Harris hip score (HSS), incidence of complications and thigh pain. Radiological findings were evaluated according Engh's classification (fixation/stability score), reactive line and grade of stress shielding. Fitting pattern of stem was classified by Nakata's method, as follow, 1)mediolateral fit, 2)flare fit, 3)dyaphyseal fit and 4)multi-point fit. Follow-up period was minimum five years and was 81.3 months in average.

**Results:** HHS before surgery was 44.2 points and that at follow-up was 91.3 points in average and pain score was significantly improved. HHS was improved significantly at follow-up, especially pain and limp/support/walk.

## The Influence of Fitting Pattern of Curved Short Stem on Femoral Bone Resorption / Stress Shielding after Primary Total Hip Arthroplasty

Calcar fracture occurred in 4 hips (1.6%) and circular wiring was performed. Dislocation was occurred in three hips (1.2%) but deep infection and venous thromboembolism (VTE) was not occurred. Thigh pain was seen in 4 hips and was disappeared in 3 hips at follow-up. Stem revision due to subsidence (>5 mm) was performed in one hip. Aseptic loosening and osteolysis, was not existed.

**Radiographic findings:** Fixation / Stability score were 23.1 + 3.2 points and it meant as bone ingrown. Reactive line was seen in 6 hips at tip of stem at AP view. Stress shielding was minimum and it observed in only proximal area of miner trochanter. In relationship of fitting pattern and stress shielding, mediolateral fit indicated lower grade of stress shielding than other types with statistical significance.

**[Study 2 / Minima stem] Materials and methods:** From September 2017, we performed cementless THA by the curved short stem (Minima stem) for osteoarthritis with dysplasia. One hundred and fifty three hips of 138 patients were examined including 24 males and 114 females. Age at surgery was 63.6+10.9 years old in average. Surgical approach was used modified Watson-Jones in all hips. Clinical evaluation was used Harris hip score (HSS), incidence of complications and thigh pain. Radiological findings were evaluated according Engh's classification, reactive line and grade of stress shielding. Fitting pattern of stem was classified by Nakata's method. Follow-up period was

minimum one year and was 34.7 months in average. **Results:** HHS before surgery was 43.6 points and that at follow-up was 90.2 points in average and pain score was significantly improved. HHS was improved significantly at follow-up, especially pain and limp/support/walk.

Tip fracture of greater trochanter occurred in 2 hips (1.3%) and no treatment was performed. Dislocation was occurred in three hips (1.9%) but deep infection and venous thromboembolism (VTE) was not occurred. Thigh pain was seen in 9 hips and was disappeared in all hips at follow-up. No stem revision due to any reason was performed. Aseptic loosening and osteolysis, was not existed.

**Radiographic findings:** Fixation / Stability score were 20.0 + 3.8 points and it meant as bone ingrown. Reactive line was seen in 79 hips at tip of stem at AP view. Stress shielding was minimum and it observed in only proximal area of miner trochanter. Relationship between fitting pattern and grade of stress shielding was not observed.

**[Study 1 & 2] Conclusions:** One of complications of short stem after op was a failure of primary fixation that leads to stem subsidence during early periods but there was only one failure in our studies. Low incidence of bony alterations after a follow-up of 3 years in average indicates stable and durable osteointegration and normal load distribution of two types of curved short stem.



## MODERATOR

### Yoshitada HARADA, M.D., Ph.D.

- Advisor, Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital, Japan

#### EDUCATION

- 1976-82 M.D. Chiba University, School of Medicine
- 1986-90 Doctor of Medicine, Ph.D. Chiba University, Post Graduate School of Medicine

#### AWARDS

2003 Otto Aufranc Award ( Three-dimensional shape of the dysplastic femur: implications for THR. Clin Orthop 2003 Dec;(417):27-40 )

#### ACADEMIC EXPERIENCE (1996-2008)

- 2007 Oct. - 08 Associate Professor, Chiba University, Graduate School of Medicine, Department of Orthopaedic Surgery
- 2003 Mar. - 07 Assistant Professor, Chiba University, Graduate School of Medicine, Department of Orthopaedic Surgery
- 2001 Apr. - 03 Director, Chiba University, Graduate School of Medicine, Department of Orthopaedic Surgery
- 1994 Aug. - 01 Director, Chiba University Hospital, Department of Orthopaedic Surgery

#### WORK EXPERIENCE

- 1982 – 1983 Resident of Orthopaedic Surgery, Chiba University Hospital, Department of Orthopaedic Surgery
- 1983 – 1984 Doctor of Orthopaedic Surgery, Chiba-City Hospital, Department of Orthopaedic Surgery
- 1984 – 1985 Doctor of Orthopaedic Surgery, Kimitsu Central Hospital, Department of Orthopaedic Surgery
- 1985 – 1986 Doctor of Orthopaedic Surgery, Narashino National Hospital, Department of Orthopaedic Surgery
- 2008 – 2023 President of Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital in Chiba
- 2023 – present Advisor of Center for Arthritis and Joint Surgery, Saiseikai Narashino Hospital in Chiba

#### RESEARCH INTERESTS

- Pathogenesis of osteolysis after total joint replacement
- Recruitment of osteoclasts in pathologic conditions
- Biomaterials for total joint replacement
- Image analysis of CT and MRI in Hip disorders
- Development of prosthesis for the hip joint (plate system and THA)

## SESSION 4 THE HIP

**MODERATOR****Albertus GANDAKUSUMA, M.D.**

- Surgeon, EMC Alam Sutra & Bethsaida Hospital, Indonesia

Dr. Albert Gandakusuma, Sp. OT is an Orthopedic Specialist Doctor, he was born in Surabaya, November 4 1969. Currently, dr. Albert Gandakusuma, Sp. OT practices at EMC Alam Sutera Hospital as an Orthopedic Doctor. The services he provides include consultations before bone surgery.

Dr. Albert Gandakusuma, Sp. OT completed his General Medicine education at Katholiek Universitet Leuven, Belgium (1992-1998) and Specialist in Orthopedics and Traumatology at the University of Indonesia (2005). He attended the Nepean Private Hospital, Sydney, Australia Adult Joint Reconstruction Orthopedic Surgery course: Total Hip Arthroplasty, Total Knee Arthroplasty in 2006.



## Satoshi NAGOYA, M.D., Ph.D.

- Deputy Chief, Sapporo Kojinkai Memorial Hospital
- Director of the Arthroplasty Center, Sapporo Kojinkai Memorial Hospital
- Director of the Hip Center, Sapporo Kojinkai Memorial Hospital

### PROFESSIONAL CAREER

- 1986 – 1987 Resident, Department of Orthopaedic Surgery, School of Medicine, Sapporo Medical University
- 1987 – 1988 Clinical Fellow, Urakawa Red Cross Hospital
- 1988 – 1990 Research Fellow, Department of Pathology, School of Medicine, Sapporo Medical University
- 1990 – 1992 Research Fellow, Department of Oncology, University of Washington, USA
- 1992 – 1994 Clinical Fellow, Asahikawa Kosei Hospital
- 1994 – 2001 Instructor, Department of Orthopaedic Surgery, School of Medicine, Sapporo Medical University
- 2001 – 2005 Assistant Professor, Department of Orthopaedic Surgery, School of Medicine, Sapporo Medical University
- 2005 – 2012 Associate Professor, Department Orthopaedic Surgery, School of Medicine, Sapporo Medical University
- 2007 Participation in the Northern Region International Exchange Program (Helsinki University)
- 2012 – present Professor, Department of Musculoskeletal Biomechanics and Surgical Development, Sapporo Medical University

### Introduction

The concept of an extensive hydroxyapatite (HA) coating (Corail stem) for the fixation of a tapered femoral stem was introduced 25 years ago in the hope that we could achieve durable biological fixation while minimize bone atrophy due to stress shielding. The value of uncemented fixation using HA-coated implants is now widely accepted.

### Methods

Conformity stem was categorized into HA-coated stem group. Although the stem shape followed Corail stem, the length of Conformity stem is shorter than that of the Corail stem. This retrospective study conducted early clinical results of our experience to use Conformity stem in 11 female patients with an average age of 70.2 years. The used stems were 2 to 7 in size, all collared stems, the STD type in 3, short in 5, varus in 3. To minimize surgical invasion, we employed MIS OCM approach to perform THA. In these settings, soft tissues including short rotator muscles could be preserved as well as gluteus medius muscle. There were no patients who had local neurapraxia of the lateral femoral cutaneous nerve-related area.

### Results

Radiographic results showed that all stems were inserted straight, no subsidence, no fracture, no bone reactions were evidenced at a short time follow-up periods.

## The Standing Position of Corail-type Full HA-coated Stem and the Promise of Conformity Stem for Bone and Soft Tissue Sparing in Total Hip Arthroplasty

### Discussion

Several reports revealed that A full HA-coated stem applied on a straight and proximally flared stem induces substantial benefits in silent bone remodeling.

Our clinical study that resulted in no clinical adverse effects including periprosthetic fracture, stem sinking and thigh pain indicated that the extensive hydroxyapatite (HA) coating can be expected with modification of slight resorption at the calcar level, absence of cortical hypertrophy and alleged stress shielding in the future.

### RESEARCH INTERESTS

- Hip Surgery (Acetabular osteotomy, Total Hip Arthroplasty)
- Bone and Soft Tissue Sarcoma and Reconstructive Surgery of the Hip Joints and the Pelvis
- Tumor Immunology



## Yun-Seong CHOI, M.D.

- Orthopedic surgeon, Sports Medicine and Adult Reconstructive Knee Surgery, Veterans Health Service Medical Center

### INSTITUTION AND POSITION

- Current (2022 – ) Orthopedic surgeon, Sports Medicine and Adult Reconstructive Knee Surgery, Veterans Health Service Medical Center
- 2021 – 2022 Clinical Fellow, Sports Medicine and Adult Reconstructive Knee Surgery, SMG-SNU Boramae Medical Center
- 2020 – 2021 Clinical Fellow, Sports Medicine and Adult Reconstructive Knee Surgery, Seoul National University Bundang Hospital

### Background

This study aimed to 1) assess the effect of total hip arthroplasty (THA) on coronal limb alignment, namely, the hip–knee–ankle angle (HKA), 2) identify factors that determine changes in the HKA, and 3) determine whether alignment changes influence the knee joint space width.

Methods: We retrospectively evaluated 266 limbs of patients who underwent THA. Three types of prostheses with neck shaft angles (NSAs) of 132°, 135°, and 138° were used. Several radiographic parameters were measured in the preoperative and final radiographs (at least 5 years after THA). A paired t-test was used to confirm the effect of THA on HKA change. Multiple regression analysis was performed to identify radiographic parameters related to HKA changes following THA and changes in knee joint space width. Subgroup analyses were performed to reveal the effect of NSA change on the HKA change, and the proportion of total knee arthroplasty (TKA) usage and changes in radiographic parameters between maintained joint space and narrowed joint space groups were compared.

### Results

The preoperative mean HKA was 1.4° varus and increased to 2.7° varus after THA. This change was related to changes in the NSA, lateral distal femoral angle, and femoral bowing angle. In particular, in the group with a decrease in NSA of > 5°, the preoperative mean HKA was largely changed from 1.4° varus to 4.6° varus after THA. The prostheses with NSA of 132° and 135° also led to greater varus HKA changes than those with an NSA of 138°. Narrowing of the medial knee joint space was related to changes in the varus direction of the HKA, decrease in NSA, increase in femoral offset.







## Alejandro HERNÁNDEZ, M.D., Ph.D.

- Orthopedic Surgeon Hospital Josep Trueta, Girona, Spain.

### PROFESSIONAL STATUS

- 2001 – 2006

Staff member

Septic Unit, Dept. of Orthopaedic Surgery and Traumatology in Vall d'Hebron Hospital, Barcelona, Spain

- 2006 – 2015

Staff member

Hip Unit, Dept. of Orthopaedic Surgery and Traumatology Vall d'Hebron Hospital, Barcelona, Spain

- 2015 – 2016

Coordinator

Hip Unit, Dept. of Orthopaedic Surgery and Traumatology Vall d'Hebron Hospital, Barcelona, Spain

- 2015 – 2016

Head of research line: "Estudio de la articulación de la cadera."

Investigation group: "Cirugía reconstructiva del aparato locomotor". Vall d'Hebron Research Institute.

### SOCIETY MEMBERSHIP

- Sociedad Española de Cirugía Ortopédica y Traumatología
- European Hip Society
- Spanish Hip Society

### INTRODUCTION

Among periprosthetic fractures, the most frequent are those affecting implant stability, types B2 and B3 in the Vancouver classification. The management of this type of fracture requires almost always the revision of the implant and the removal of the cement mantle in cemented stems.

There is a controversy about what type of stem must be used in cases of revision (long cemented vs. uncemented), what type of internal fixation must be associated, and when we must make isolated internal fixation without revision of the stem.

### METHOD

An observational study was conducted to compare long cemented and uncemented revisions in B2 periprosthetic uncemented fractures during the first years after the surgery. Surgical time, days of hospitalization, weight load, and complications were compared. An X-ray was used to evaluate subsidence and fracture consolidation 1 year after the revision.

### RESULTS

The surgical time was shorter in uncemented revisions (152,9' vs. 162,1') P: 0,617, but the weight load was delayed (20.6 days vs. 8.5 days) P : 0,000, and the inpatient days were longer (24.9 days vs. 16.8 days) P: 0,039.

The overall complication rates were higher in uncemented revision (61.5% vs. 23.5%) P = 0,035. Pseudoarthrosis was the main complication in the uncemented group (53.8% vs. 17.6%). The reintervention rate was also higher in the uncemented group (45.1% vs. 5.9%).

## Surgical Options in the Treatment of Vancouver Type B2 and B3 Periprosthetic Fractures

### DISCUSSION

The management of periprosthetic B2 and B3 fractures is controversial.

Our results suggest that anatomic reduction associated with cerclage fixation and long cement revision led to early weight load and reduced surgical complications.

Nevertheless, there is a concern about the capacity of the bond between new cement and old bone that could lead to an early loosening of the implants.

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## Heine Rust DE JONGH, M.D.

- Senior Consultant – Arthroplasty, Reunion Orthopaedics (Pty) Ltd
- Surgeon, Panorama Medi Clinic, South Africa

Dr. Heine De Jongh completed his medical degree, followed by his degree in orthopaedic surgery at Stellenbosch University. He is in private practice since 2001. He is also affiliated with the Arthroplasty Unit at Tygerberg Academic Hospital (Stellenbosch University) :

- External Examiner
- Part-time Lecturer
- Complex Surgeries
- Research

### SPECIALIZES

- Hip Primary and Revision Arthroplasty
- Hip Arthroscopic Reconstructive Surgery
- AMIS (Anterior Minimally Invasive Surgery)/DAA (Direct Anterior Approach)
- Knee Primary, Knee Robotic and Revision Arthroplasty
- Knee Arthroscopic Reconstructive Surgery

The direct anterior approach (DAA) for total hip arthroplasty (THA) has gained popularity among both surgeons and patients due to potential benefits such as faster recovery and reduced pain post-surgery.

Performing THA supine, on a standard operating table (without a traction table), can be very challenging in complex primary and revision cases. This talk will focus on how to identify and manage common difficulties, avoiding pitfalls and safe navigation of the DAA in complex and revision cases. What would be the contra-indications for DAA and some personalized tips and tricks to be utilize in revision cases with the extended variations to the approach.





## Delfilio MARTÍNEZ, M.D.

- Chief, Joint Replacement Department of the Armed Forces Central Hospital, Dominican Republic

### WORK EXPERIENCE

- Current Traumacare Specialist.
- Former Coordinator of the Orthopedics and Traumatology residency at the Central Hospital of the Armed Forces. 2018 – 2022.
- Head of the Pediatric Orthopedics service at the Dr. Hugo Mendoza Pediatric Hospital.
- Professor at the Ibero-American University (UNIBE) Coordinator of the Surgical Block and the Orthopedics Chair 2010 to the present.
- Pediatric Orthopedist at the Dr. Robert Reaid Cabral Pediatric Hospital currently.

The study focuses on total hip arthroplasty in young patients with severe hip pathologies and a three-year postoperative follow-up. Challenges associated with this surgery in pediatric patients, such as high revision rates and premature implant wear, are discussed.

The results reveal a significant improvement in hip functionality and quality of life for patients after surgery. The Harris and Merle D'aubigné et Postel scales are used to assess outcomes, showing a positive correlation between both scales. Furthermore, no signs of septic or aseptic loosening were observed in any patient during the follow-up period.

The study supports the notion that total hip arthroplasty can be beneficial for young patients with severe hip problems, despite the challenges involved. The importance of continuous and personalized follow-up is emphasized, as well as thorough preoperative evaluation and proper management of potential complications. However, further long-term research is needed to fully understand the benefits and potential long-term issues of this intervention in this population.

## Hip Replacement in Immature Bone with 5-year Follow-up from 12 to 18 Years

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SESSION 4

Each Step We Care



## MODERATOR

### Paul LEE, M.D., Ph.D.

- Visiting Professor, Sports Medicine, the University of Lincoln, United Kingdom
- Surgeon, the Keep Clinic, United Kingdom

Dr. Paul Lee, Consultant Orthopedic Surgeon, and Double Visiting Professor of Sports Medicine and Medical Engineering, holds a PhD in Medical Engineering, MSc in Sports Medicine, and various surgical fellowships. He's an esteemed medical doctor and engineer, applying engineering principles to musculoskeletal medicine.

With a PhD in medical Cell Engineering and surgical fellowships in Regenerative Medicine. Prof Lee is an internationally recognized medicine, he was awarded ICRS teaching center of excellence. He practices at the London Cartilage Clinic and 108 Harley Street as a regenerative medicine expert, and specializes in minimally invasive surgery, including ACL and hip/knee replacements.

Within the Gilmore's Groin team at the London Sports Injury Clinic, Prof. Lee, in collaboration with Mr. Simon Marsh, linked Oestitis Pubis, Gilmore's groin and adductor pathology to the A.S.I.A. syndrome and developed successful treatments. He's a regional surgical advisor for the Royal College of Surgeons of Edinburgh and is actively engaged in medical teaching.

Prof. Lee leverages digital technology, AI, and deep learning in musculoskeletal regenerative medicine, serving as the medical director of MSK Doctors. He established the ENRICH-MSK partnership and MSK-AI motion lab, securing national funding awards, including Innovate UK, for research. With 100+ research publications and 1000+ citations, he's a pioneering figure in the field.

- 2005 / MBBch / Undergraduate Cardiff University
- 2011 / MSc / Postgraduate (Sports and exercise Medicine) UWIC
- 2014 / PhD / Postgraduate (Medical Engineering) Cardiff University
- 2014 / FEBOT / Fellowship European Board of Orthopaedic Trauma
- 2015 / FRCS (T&O) / Fellowship Royal college of Surgeons of Edinburgh
- 2015-2016 / BOA / Management Clinical Leadership Fellow
- 2016 / CCT / GMC Trauma and Orthopaedic surgery
- 2016-2017 / Health Foundation, Q NHS / Management Clinical Entrepreneur Fellow, Community Member, Quality Improvement
- Since 2017 / Consultant Orthopaedic Surgeon / NHS England
- Since 2018 / Harley Street Consultant / Harley Street, London Sports Injuries Clinic, London Cartilage Clinic, MSK Doctors
- Since 2018 / Medical Director / MSK Doctors The Keep Clinic, MSK House, OPEN MRI



## SESSION 5 THE KNEE



## MODERATOR

**Jean-Yves JENNY, M.D.**

- Senior consultant, University Hospital Strasbourg
- Former Associate Professor at Strasbourg University, Orthopedic and Trauma Surgery

**INSTITUTION AND POSITION**

- Current position (since February 1, 2019) : Senior consultant, University Hospital Strasbourg, Department "Locomax" – Chief of staff: Professor F.BONNOMET
- September 1, 2014 to September 30, 2018 : Associated Professor of the University of Strasbourg

**EXPERIENCE**

- August 1, 2007 to January 31, 2019 : Senior consultant, University Hospital Strasbourg, Center for Orthopedic and Hand Surgery of Strasbourg (CCOM) – Chief of Staff: Professor J.F.KEMPF
- June 1, 1996 to July 31, 2007 : Senior consultant – Chief of the Department of Knee Surgery and Sport Medicine – Senior Consultant at the Department for Septic Orthopedic Surgery, Center for Traumatology and Orthopedic Surgery of Strasbourg – Chief of Staff : Pr I.KEMPF followed by Pr. P.KEHR



## Jérôme VILLEMINOT M.D.

- Medical Director, Clinique Sainte Odile de Haguenau, France

Whether it's mine, or those of my patients, my life revolves around knees !

Parisian by origin, but Alsatian by training,  
I have been based at the Clinique Sainte Odile de Haguenau since 2000,  
and of which I have been the medical director since 2020.  
My surgical activity is exclusively centered on the knee.  
(Arthroscopy, ACL Replacement and Knee Prosthesis)

Attracted by change and innovation, and after a management degree,  
outpatient care has become obvious in terms of quality of care provided to patients.  
So, I performed the first outpatient total knee prosthesis in France in May 2012. Currently,  
ambulatory surgery represents 100% of my total knee prosthesis activity,  
for the last 3 years...

And naturally, the evaluation of my practice, the quality of care, and the patient satisfaction have  
become essential in the evolution of my surgical activity.

This is why I co-founded DIGIKARE, a data company,  
which publishes ORTHENSE, a digital platform for collecting real-life patient data,  
by the patients themselves.

The lessons of this listening to patients are countless,  
and so much more relevant than when they pass through the filter of the doctor...

" Measure better to treat better! "

## TKA Day Surgery

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Each Step We Care



## Saúl MARTÍNEZ, M.D.

- Chairman, Orthopedic Service, Hospital Universitario Santa Clara, Bogota, Colombia
- Orthopaedic Surgeon, Centro medico Colmedica Medicina Prepagada, Bogota, Colombia

### Research

- Registry Study Clinical follow up hip and knee prosthesis October 2013- Currently
- Multinational Multicenter Study Surgical Treatment hip fractures 2011- Currently

### EXPERIENCE

- ORTHOPEDIC SURGEON : Hospital Universitario Santa Clara. Bogota . February 2002
- Chairman Orthopedic Service from July 2003 Currently
- Scientific Director CLEMI foundation Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2013-2015
- National Director Education and Training Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2012-2015
- Consultant Smith and Nephew USA 2014 Currently
- Consultant Waldemar Link Germany 2016 Currently

Approximately half of all peri-articular fractures around the knee occur in osteoporotic patients aged over 50 years as a result of low-energy trauma. These periarticular knee fractures in the elderly are difficult to deal with because of poor bone quality, preexisting arthritis, comminution and osteochondral damage at time of injury. The goals of treatment include pain control, early mobilisation, restoration of function and mobility, and minimisation of the need for further surgery.

Although ORIF is the mainstay of treatment in young patients, there are many unique challenges associated with the osteosynthesis of these complex fractures in elderly patients. These include not only the surgical considerations of comminution of the fracture and poor bone quality, but additional issues of medical comorbidities and a requirement for early mobilisation. Unsatisfactory outcomes are common following reduction and fixation in elderly patients with osteoporotic bone. Complications include loss of fixation, post-traumatic arthritis (requiring a second surgery with TKR that can be difficult to undertake), malunion, non-union, stiffness, and medical complications secondary to immobilisation. These difficulties have led several authors to propose the use of TKR for acute, first-step management of these injuries. TKR is a viable option for elderly patients with osteoporotic bone.

As primary arthroplasty has progressively become the standard of care for certain proximal femur fractures, proximal humerus fractures and elbow fractures in the geriatric population, a similar change in treatment strategies has been suggested for distal femur fractures.

## Arthroplasty as Treatment in Knee Fractures

Geriatric distal femur fractures are challenging to treat. The high mortality rate associated with a loss of mobility in this population has led some authors to compare distal femur fractures to femoral neck fractures with respect to the importance of rapidly regaining mobility in the geriatric population. Acute distal femur replacement has been advocated by some as a preferred treatment over internal fixation because arthroplasty may facilitate a more rapid return to a patient's baseline mobility level with an acceptable rate of complications and good functional results.

### Areas of Interest

- Hip Reconstructive Surgery and Preservation
- Hip and Pelvis Trauma Surgery
- Fragility Fractures
- Complex Revision Hip
- Periprosthetic Fractures







## Nicolás RESTREPO, M.D.

- Orthopaedic Surgeon, University Hospital of Nariño  
Department, Colombia

### SPECIAL TRAININGS

- Hip Arthroplasty: Germany (Bad Rappenau)
- Minimal Invasive Surgery: Rush Presbyterian Hospital Chicago (Dr. Berger) & Johns Hopkins (Baltimore)

### EXPERIENCE

- President of the SCCOT (Colombian Orthopaedic Society) Hip & Knee Chapter. 2007-2009
- President Sociedad Colombiana de Ortopedia y Traumatología SCCOT (Colombian Orthopedic Society) 2009-2011

### INTRODUCTION

Revision Total Knee Arthroplasty is one of the most successful procedures but for 2030 we are expecting an increase of 300 hundred times for this event; nowadays, infection, severe bone loss and multi/ligament injuries are requiring revisions with more constriction. Hinged implants are designed for medial collateral insufficiency, severe damage of the posterior capsule, massive bone lost, problems that we are facing continuously.

### HISTORY

Not so long time ago, we only have non/rotatory hinged implants, often made by poly, with big failure rates; additionally in severe bone loss, we utilized allografts, with difficult ligament reconstruction and poor long term outcomes. Right now we can have rotatory implants, who prolong survival time and efficiency

### INDICATIONS

- Multiple prior revision surgeries
- Extensor mechanism lesions
- Periprosthetic joint infection with severe tisular and bone loss
- Hiperextension for neuromuscular disease
- Severe primary deformities
- Primary or subsequent instability (Medial collateral)
- Distal femoral fractures with or without implants



## Endoprosthesis in TKA When Indicated

### SURGICAL TECHNIQUE, TIPS AND TRICKS

Usually all begins with a good preoperative planning according to select bone resection, femoral, tibial stem sizes and if we will going to need offset corrections. Once at the OR, it is important to do an adequate soft tissue release and reproduce the planned cuts in order to achieve good patellar height and proper mobility.

### MEDICINE BASED EVIDENCE

There are multiples papers and studies that favored rotating platform over fixed platform, with knee function improvement in all scores and good survival rates more than 70% at 10 years.

### TAKE HOME MESSAGES

Knee endoprosthesis are evolving providing good solutions for difficult cases; there are objective and clear indications also in difficult primaries with collateral medial deficit. It is important to know well the technique and make a good preoperative planning, obtaining good outcomes at 10 or more years.

**MODERATOR****Kui-Chou HUANG, M.D.**

- Deputy Superintendent, Chairman of Orthopaedic Department, Asia University Hospital, Taiwan

**WORK EXPERIENCE**

- Surgical resident, Taichung Veterans General hospital (1985-1988)
- Chief resident, Taichung Veterans General hospital (1988-1989)
- Orthopaedic attending, Taichung Veterans General hospital (1989-1990)
- Chief of orthopaedic department, Puli Veterans hospital (1991-1997)
- Chief of orthopaedic department, Chu Shang Show Chwan Hospital (1997-1999)
- Orthopaedic attending, Taichung Veterans General hospital (1999-2005)
- Deputy superintendent, Puli Veterans hospital (2005-2008)
- Deputy chairman Education Department, Taichung Veterans General Hospital (2009-2012)
- Chairman of orthopaedic department, Taichung Veterans General hospital (2009~ 2016)
- Deputy superintendent, Asia University Hospital (2016- now)
- President, Joint reconstruction society, ROC (2018-Nov.~2020 Nov.)

## SESSION 6 THE HIP


**MODERATOR**
**Nicolás RESTREPO, M.D.**

- Orthopaedic Surgeon, University Hospital of Nariño  
Department, Colombia

- Graduate Medicine: Physician & Surgeon Pontificia Universidad Javeriana
- Orthopaedic surgeon: Universidad Militar Nueva Granada
- Hip & Knee Arthroplasty and Revision Surgery  
Fellowship: Mount Sinai Hospital (Toronto- Canada with Dr. Alan Gross)

**SPECIAL TRAININGS**

- Hip Arthroplasty: Germany (Bad Rappenau)
- Minimal Invasive Surgery: Rush Presbyterian Hospital Chicago (Dr. Berger) & Johns Hopkins (Baltimore)

**EXPERIENCE**

- President of the SCCOT (Colombian Orthopaedic Society) Hip & Knee Chapter. 2007-2009
- President Sociedad Colombiana de Ortopedia y Traumatología SCCOT (Colombian Orthopedic Society) 2009-2011



## Pang-Hsin HsIEH, M.D.

- President, Joint Reconstruction Society, R. O. C. (Taiwan)
- Professor, Department of Orthopedics, Chang Gung Memorial Hospital, Linko, Taiwan

### PROFESSIONAL TRAINING

- 1994-1996 Resident, Chang Gung Memorial Hospital, Department of Surgery
- 1996-1999 Resident, Chang Gung Memorial Hospital, Department of Orthopedics
- 1999-2000 Fellow, Chang Gung Memorial Hospital, Joint Reconstruction
- 1999- Attending Staff, Chang Gung Memorial Hospital, Department of Orthopedics
- 2004 Assisted Professor, Chang Gung Memorial Hospital
- 2007 Associate Professor, Chang Gung Memorial Hospital
- 2008-2009 Visiting scholar, Osaka University, Japan
- 2011- Professor, Chang Gung Memorial Hospital

### PROFESSIONAL ACHIEVEMENT

- 2022-2024 President, Joint Reconstruction Society of Taiwan
- 2010-2016 Chief, Department of Joint Reconstruction, Chang Gung Memorial Hospital
- 2019, 2020, 2021 Three-time winner of National Innovation Award, Taiwan

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## Kuo-Cheng SHIH, M.D., M.P.H

- Senior Orthopedic Consultant, Specialized in Joint reconstruction, Miaoli General Hospital, Ministry of Health and Welfare, Taiwan

### PROFESSIONAL EXPERIENCES

- 1979-1981 Served as a military physician
- 1981-1986 Resident of Department of Orthopedics, National Taiwan University Hospital, Taipei, Taiwan
- 1986- Staff, Department of Orthopedics, National Taiwan University Hospital , Taipei, Taiwan
- 1987- Lectures, Department of Orthopedics, School of Medicine, Medical College, National Taiwan University , Taipei, Taiwan
- 1986-1989 Visiting Staff of Department of Orthopedics, Taiwan Provincial Taipei Hospital, Taiwan
- 1989-2001 Chief of Department of Orthopedics, Taipei General Hospital, Department of Health, Taiwan
- 2001-2003 Vice superintendent, Hsinchu General Hospital, Department of Health, Taiwan
- 2003-2009 Superintendent, Chutung General Hospital, Department of Health, Taiwan

The mini-posterior approach (MPA) is one such approach, typically defined as incorporating a standard posterior joint access with more limited muscular dissection and/or incision length <10 cm.

We enrolled 20 cases with advanced arthritis of the hip in this study. There were 14 female and 6 male. The age was 38-82 years, average 65.3. The body weight was 52-85 Kg, average 62.6; and the body length was 1.51-1.71 meters, average 1.6. The BMI was 20.1-31.2, average 24.4.

During operation the piriformis tendon was preserved, and only the conjoined short external rotator (CSER) and part of quadrates femoris were cut. And the joint capsule was preserved. The acetabulum and the proximal femur were exposed very well. And the implants implantation (U2 hip, with UTF reduced stem, CoC or CoP cup and liner) was relatively easy. The joint capsule and the CSER were repaired after completing the procedures.

We found that MPA's highly reproducible results can be achieved with piriformis preservation. And there was low risk of femoral fractures, low risk of nerve injury and conversion to standard approach is easy if it is necessary.

## Mini Posterior Approach (MPA) for Total Hip Replacement

Our study demonstrated that the MPA approach facilitated earlier functional improvement, shorter hospital stays, better cosmetic outcomes, and good acetabular and femoral access for patients undergoing primary THA. Besides, the learning curve is not long. I believe most surgeon can do it well after 20 cases practices.

In conclusion, MPA is a good alternative for MIS total hip replacement.

- 2009-2013 Superintendent, Miaoli General Hospital, Department of Health, Taiwan
- 2013-2014 Superintendent, Miaoli General Hospital, Ministry of Health and Welfare, Taiwan
- 2014-now Senior Orthopedic Consultant, Specialist in Joint reconstruction Miaoli General Hospital, Ministry of Health and Welfare, Taiwan

### RESERCH INTEREST

- Minimally Invasive Total Knee Arthroplasty (MIS TKA)
- Total Joint Arthroplasty



## Saúl MARTÍNEZ, M.D.

- Chairman, Orthopedic Service, Hospital Universitario Santa Clara, Bogota, Colombia
- Orthopaedic Surgeon, Centro medico Colmedica Medicina Prepagada, Bogota, Colombia

### Research

- Registry Study Clinical follow up hip and knee prosthesis October 2013- Currently
- Multinational Multicenter Study Surgical Treatment hip fractures 2011- Currently

### EXPERIENCE

- ORTHOPEDIC SURGEON : Hospital Universitario Santa Clara. Bogota . February 2002
- Chairman Orthopedic Service from July 2003 Currently
- Scientific Director CLEMI foundation Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2013-2015
- National Director Education and Training Sociedad Colombiana de Cirugía Ortopédica y Traumatología SCCOT 2012-2015
- Consultant Smith and Nephew USA 2014 Currently
- Consultant Waldemar Link Germany 2016 Currently

### Areas of Interest

- Hip Reconstructive Surgery and Preservation
- Hip and Pelvis Trauma Surgery
- Fragility Fractures
- Complex Revision Hip
- Periprosthetic Fractures

The goals of revision total hip arthroplasty (THA) are as follows: 1. Create a construct with axial and rotational stability at the bone–implant interface, 2. Stabilize the hip joint by maintenance of length and offset, 3. Optimize joint mechanics, and 4. Improve quality of life.

In the setting of femoral bone loss, several strategies have been attempted to achieve stable diaphyseal fixation. Impaction grafting and cemented femoral stems are technically demanding and carry a high rate of complications; hence, these techniques have fallen out of favor. Cylindrical non-modular cobalt-chrome fully porous-coated femoral stems represent the earliest design of cementless diaphyseal fixation, and long-term outcomes show satisfactory survivorship, improvements in functional scores, and acceptable radiographic stability. However, the risk of intraoperative periprosthetic fracture, implant failure, proximal stress shielding, and thigh pain secondary to modulus mismatch gave way to the development of titanium cementless femoral stems as preferred method of cementless fixation. Stable fixation can be achieved over a relatively short segment of diaphyseal bone, helping the revision arthroplasty surgeon obtain a satisfactory clinical outcome for the patient with femoral bone loss.

### Monoblock tapered fluted titanium femoral stems

The earliest tapered fluted titanium stem (TFTS) was a monoblock design, developed by Wagner in 1987, with minor design changes since initial inception. Axial stability of the stem is achieved over a relatively short segment because of the tapered stem design. Rotational stability is achieved because of longitudinal flutes in the stem, with preferential biologic ongrowth at the sharp bone–implant interface. The lower modulus of elasticity of titanium is biologically favorable,



## Use of Mono-block Stems in Femoral Defects

resulting in less stress shielding and excellent proximal bone reconstitution after implantation. Adjustment of the neck length, offset and version can be done during trialing, and the final femoral stem is implanted with only single modularity at the head neck interface. This is particularly beneficial when approaching a femoral revision with an intact metaphysis and greater trochanter, allowing the stem to be inserted securely without the need for a trans-femoral osteotomy to visualize a modular junction between the stem and body segment of the implant. In addition, monoblock designs allow the use of smaller diameter stems without compromising the strength of the implant when compared to modular designs.

Clinical outcomes have been favorable for monoblock TFTS. Survivorship at 15 years, with an endpoint of revision for any reason, is estimated at 92%. Stable bony ingrowth and restoration of proximal bone stock is present at 2 years postoperatively, and this beneficial bony remodeling persists over the long-term with 94% of patients showing no radiographic decrease in the thickness of cortical bone at a mean 13.9-year follow-up. Functional hip scores were also much improved compared to preoperative values. Unlike the modular TFTS, catastrophic implant failures are rarely seen in monoblock TFTS.

The predominant concern with the monoblock TFTS is the risk of early stem subsidence and the potential for progressive hip instability. Initial short-term results with a first-generation monoblock TFTS showed a

rate of radiographic subsidence of 21% at 1 year. We now understand that the most significant factor leading to early subsidence is under-sizing of the distal stem diameter. Further developments in stem design and surgical technique have significantly decreased this risk. Recent studies have shown a 6% risk of radiographic subsidence at 2 years. In those that subside, the majority migrate a distance under 10 mm, are not associated with poor outcome scores, are identifiable as "at risk" in the early postoperative period (within 6 months), and stabilize by 1 year postoperatively. Use of a monoblock TFTS does not increase the risk of instability, or the need for revision surgery for subsidence. The revision rate for instability related to early subsidence with monoblock TFTS estimated to be between 0.8% and 2.9%, and we believe the risk is decreased significantly when a monoblock TFTS stem is used by an experienced revision hip surgeon.



## Jose Fernando SYQUIA, M.D.

- Chairman, Department of Orthopedic Surgery at De Los Santos Medical Center, Philippines

Jose Fernando Syquia graduated from the University of Santo Tomas Faculty of Medicine and Surgery (magna cum laude) and took his residency training at the Philippine Orthopaedic Center.

He was given the "Most Outstanding Orthopaedic Resident Award" by the Philippine Board of Orthopaedics and the "Most Outstanding Surgical Resident Award" by the Philippine College of Surgeons upon completion of his training.

He subspecialized in Adult Reconstruction and Joint Replacement Surgery at the Stanford University Medical Center. He is a past president of the Philippine Hip and Knee Society and is a past chairman of the Philippine Board of Orthopaedics.

He is currently the head of the Arthritis and Joint Replacement Center of De Los Santos Medical Center and the chairman of the Department of Orthopaedic Surgery of the same institution. He heads the section of Orthopaedic Surgery at Ospital ng Makati and he is an assistant professor of surgery at the UST Faculty of Medicine and Surgery.

In 1978, Lewinnek and colleagues described a "safe zone" for acetabular cup orientation with anteversion of about 15 degrees and inclination of about 40 degrees within which hip dislocation rate was about 1.5 per cent while outside of which hip dislocation rate was 6.1 percent. Since then, satisfactory cup placement on postoperative radiographs has been evaluated using these parameters.

However, questions have arisen as to the applicability of these "safe zones". A study by Abdel and colleagues in 2016 showed that 58% of their dislocated hips fell within the safe zones.

Schmalzried noted in 2009 that determining the amount of cup anteversion should consider the femoral component anteversion. In the same paper, it was noted that pelvic tilt, either coronal or sagittal, would affect cup positioning.

In the 2012 paper by Zhou and colleagues, it was suggested that in cases of severe infrapelvic obliquity with an ipsilateral abduction contracture of the hip, the cup inclination should be decreased. Inoue and colleagues in 2013 noted that aligning the cup to the transverse acetabular ligament (TAL) re-established the patient's native anteversion and when the TAL was used as a guide, only 71% of their hips were within the safe zone but there were no dislocations. Finally, a study by Zheng and colleagues in 2021 determined that acetabular cups placed within the Lewinneck safe zones during surgery were outside the safe zones during standing and during most of the gait cycle.





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### WORK EXPERIENCES

- Head of Cisewu, Garut Public Health Centre, 1997-1999.
- Medical Resident Orthopaedic and Traumatology Specialisation in Specialist Medical Education Programme in Faculty of Medicine, Universitas Padjadjaran and Hasan Sadikin Hospital Bandung, January 2000-January 2005.
- Medical Functional Staff Doctor in Cibabat Cimahi Regional Public Hospital, April 2005-present.
- Head of Nosocomial Infection Committee in Cibabat Cimahi Regional Public Hospital, 2005-present.
- Head of Education and Training Installation Cibabat Cimahi Regional Public Hospital.
- Head of Medical Accreditation Service of 16 Services Working Group in Cibabat Cimahi Regional Public Hospital, 2012.
- Head of Subcommittee of Medical Quality Committee in Cibabat Cimahi Regional Public Hospital, 2011-present.

### Background

Avascular necrosis is condition the death of bone tissue due to a lack blood supply. Avascular necrosis may predispose joints to septic process particularly in the immunosuppressed individual. In advanced, arthritis stages, total hip arthroplasty is the standart treatment. The infection rate after two-stage total hip arthroplasties performed after primaty septic arthritis of hip has been studied there are 14 %.

### Aim

This report to view despite a higher complication rate two-stage THR was still deemed a worthy procedure because hip function was significantly improved in patients with primary septic arthritis of the hip.

### Method

Patients with septic arthritis of the hip who received total hip arthroplasty following a resection arthroplasty and bone cement spacer.

### Result

After three weeks first operation, we found there is no sign of infection and after second operation still no sign of infection and reduce of pain.

## Two Stage Total Hip Arthroplasty for AVN Due to Septic Arthritis in the Hip Joint

### Conclusion

Two stage operation for AVN due to septic arthritis give good result.

### Keywords

two-stage THA, avascular necrosis, septic arthritis.

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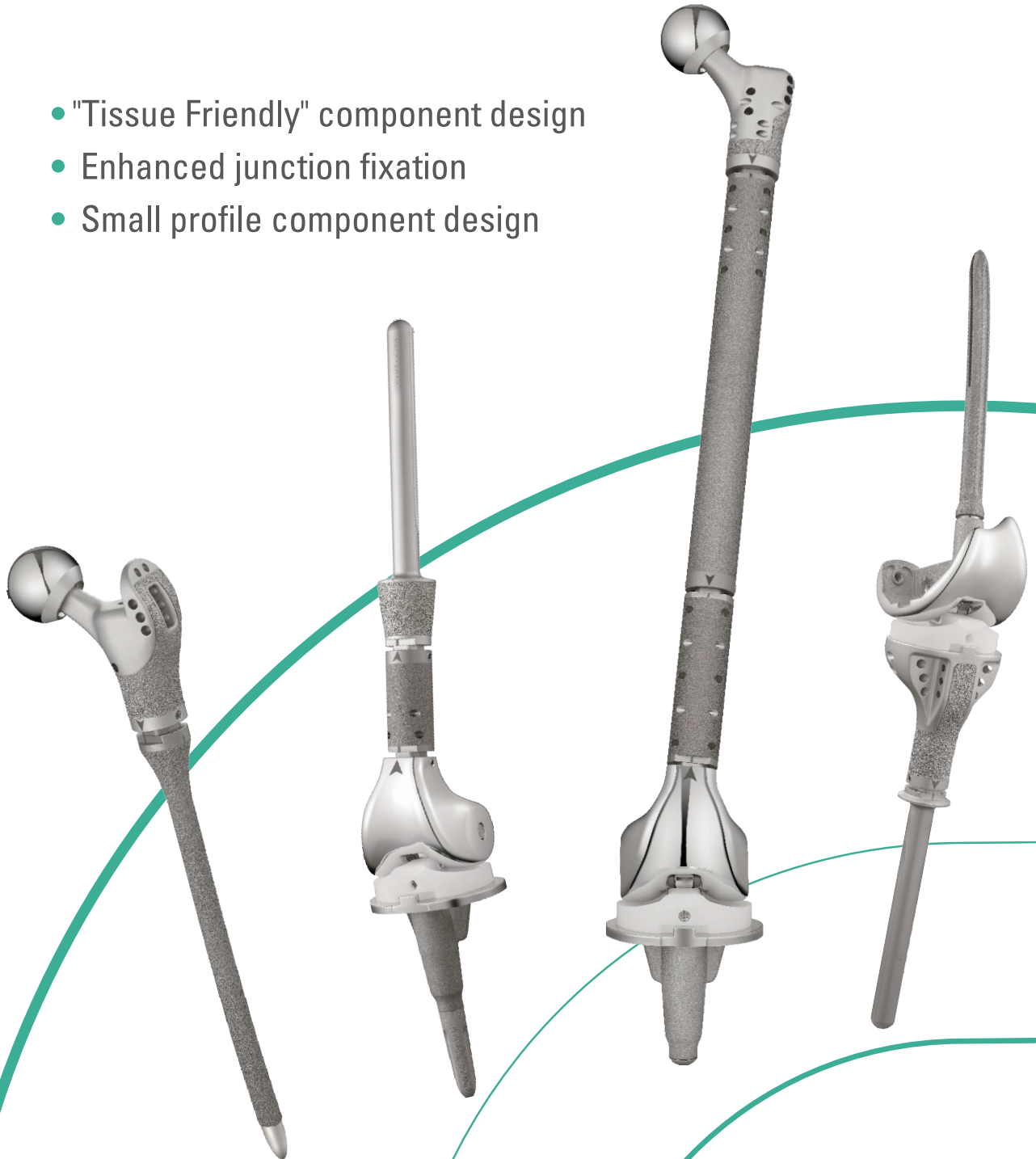




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