

Accuracy of Advanced Active Robot for TKA ; A Cadaveric Study

Yong-Beom Park¹, Young-Bong Ko², Seong Hwan Kim³

Department of Orthopedic Surgery,

¹Chung-Ang University Gwangmyeong Hospital, Chung-Ang University College of Medicine

²Jounachim Hospital

³Chung-Ang University Hospital, Chung-Ang University College of Medicine

Yong-Beom Park

Consultant, Robot for Knee Arthroplasty, Curexo Inc.

Consultant, Cartilage Regeneration using ADSVF, Rokat Health Care Inc.

Total Knee Arthroplasty: Satisfaction

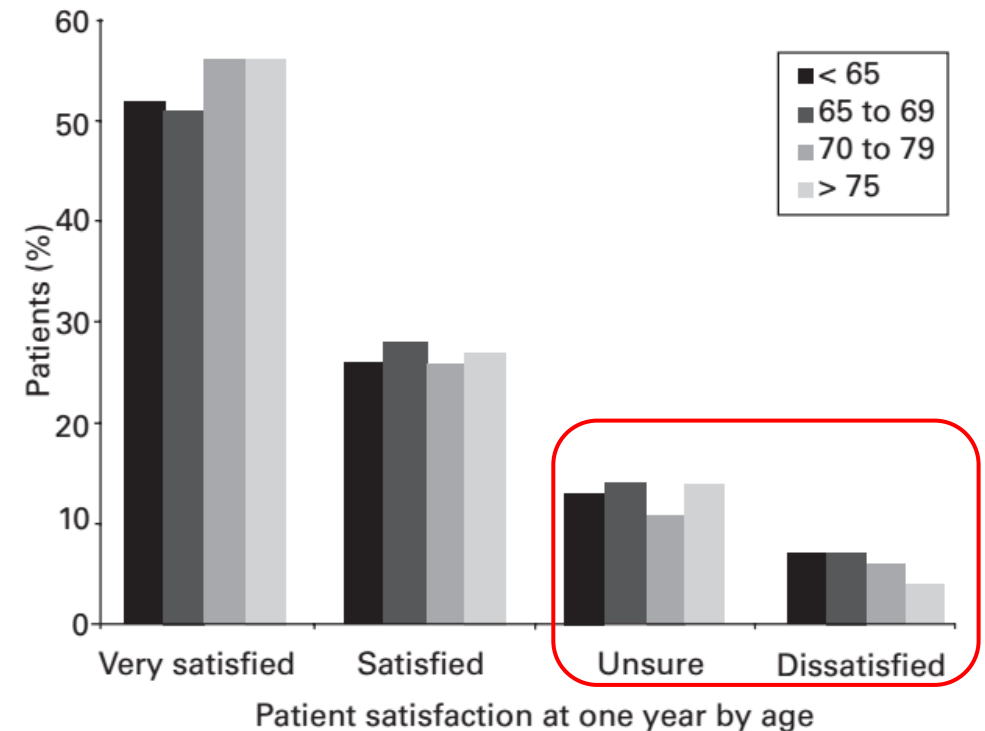
- TKA

- ✓ Established & highly effective for end-stage OA
- ✓ 5~20% of patients : dissatisfaction



Predicting dissatisfaction following total knee replacement

A PROSPECTIVE STUDY OF 1217 PATIENTS



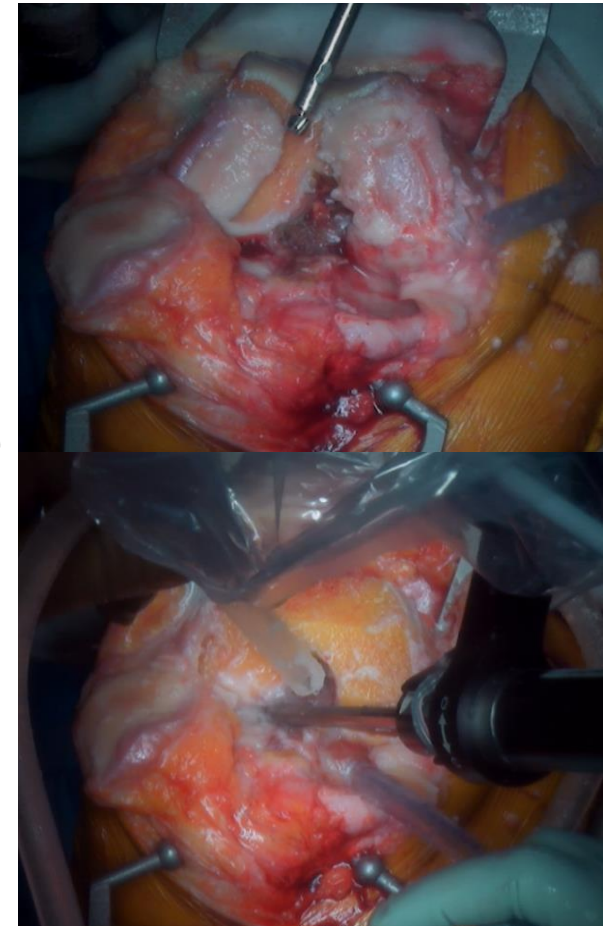
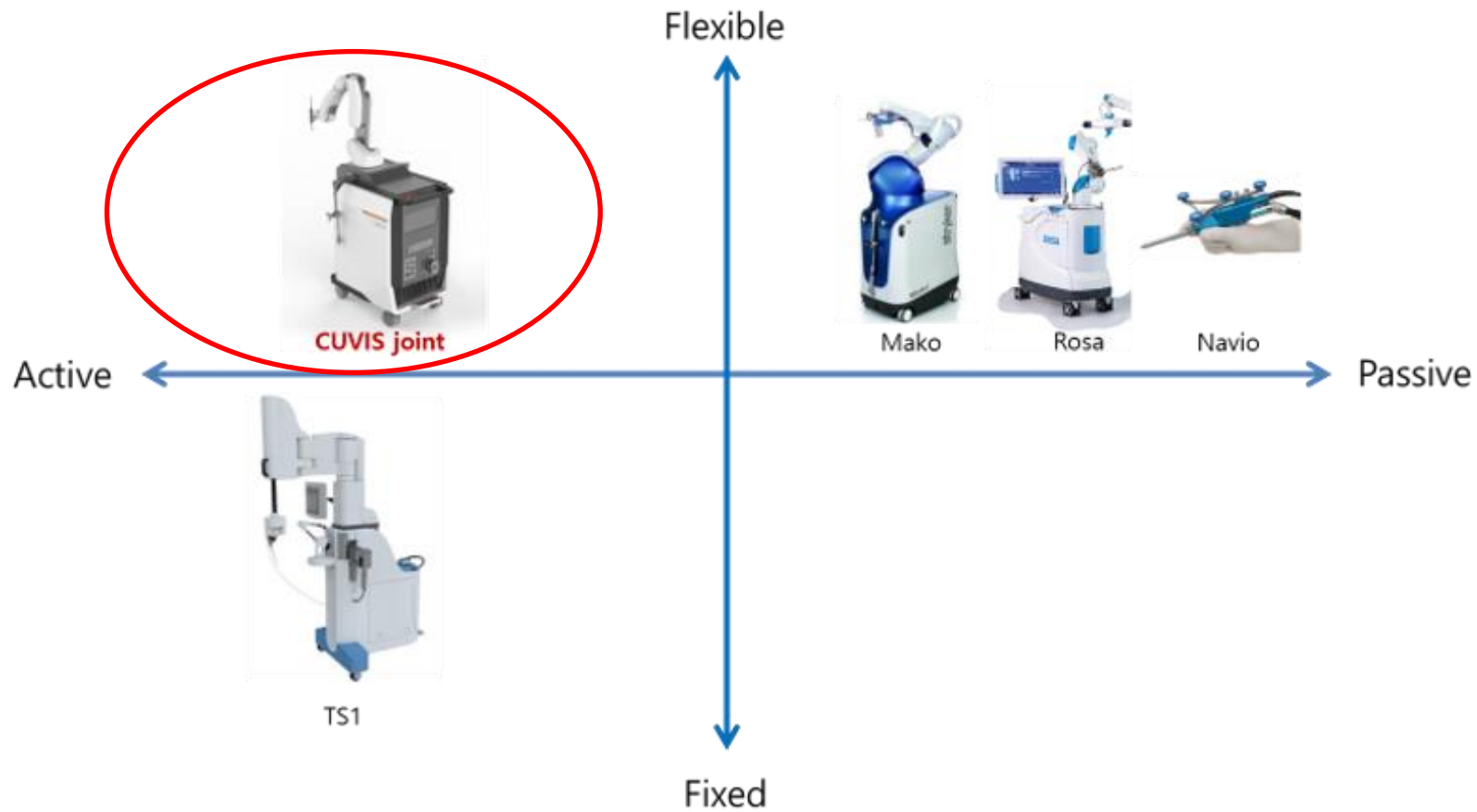
Several Robotics for TKA

- Improving clinical outcome through accurate bone cutting & implant position



Active Robotic System

- Newly advanced active robotic system for TKA

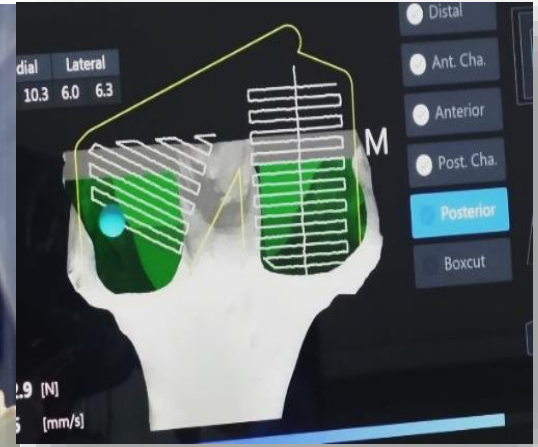
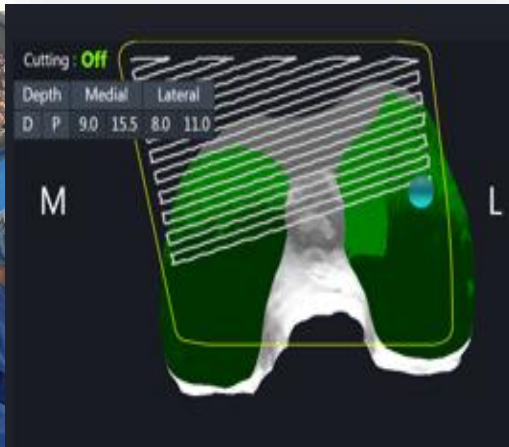
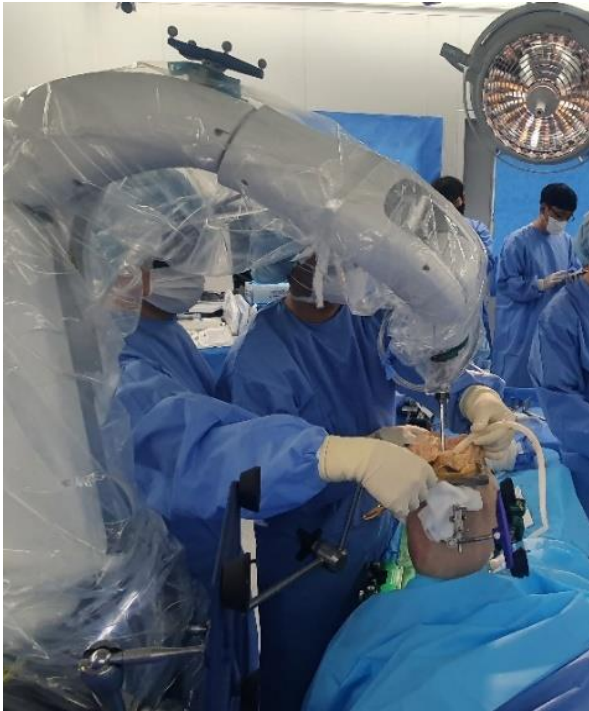


Purpose

- to determine the **accuracy of bone cuts in terms of thickness and alignment** using this newly advanced active robotic system for TKA

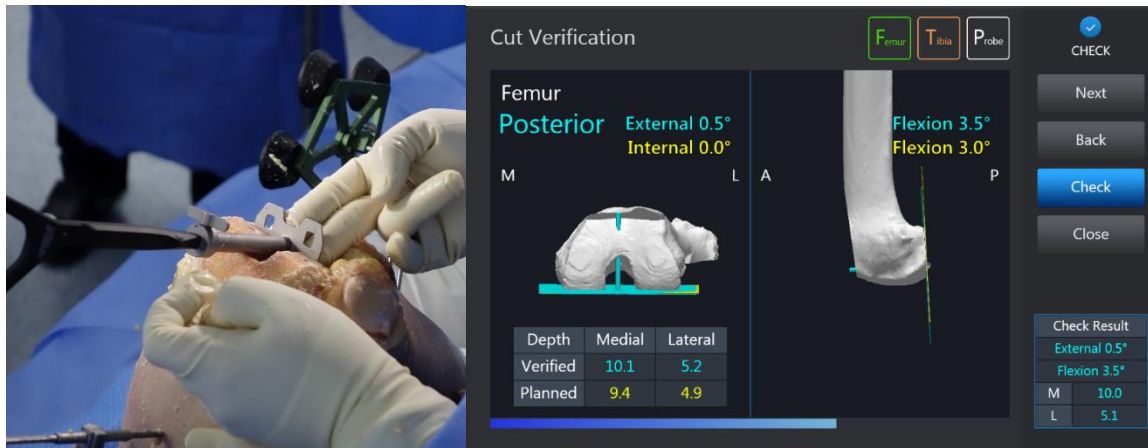
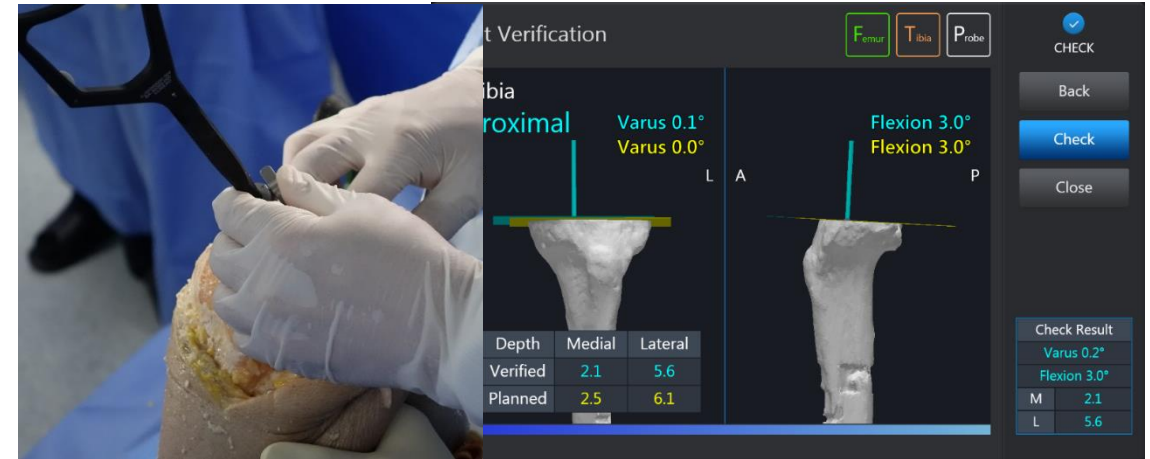
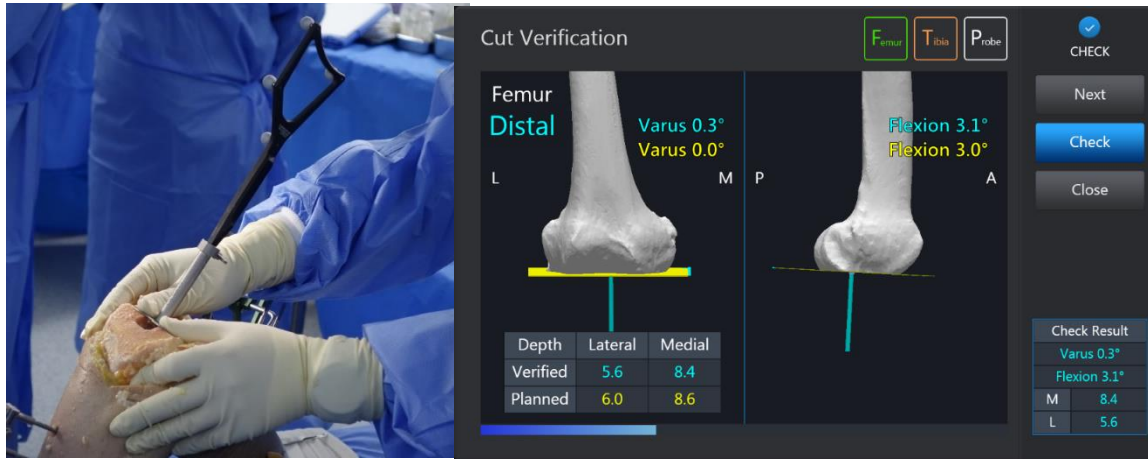
Methods

- Six cadaveric knees
- TKA using active robotic system (CUVIS-Joint[®], Curexo inc.)



Methods: Measurement of Bone Resection

- **Thickness and angle**
- ✓ **three planes (distal femoral plane, posterior femoral plane, and tibial plane)**



- Accuracy of cutting depth

Case No.	Difference between actual cutting and the plan (mm)					
	Femur Distal		Femur Posterior		Tibia Proximal	
	Medial	Lateral	Medial	Lateral	Medial	Lateral
#1	0.2	0.3	-1.3	-1.2	0.5	0.6
#2	1.2	1.1	-0.7	-0.4	0.3	0.6
#3	-0.2	-0.1	-1.3	-1.6	0.3	0.8
#4	0.0	0.1	-0.8	-0.1	0.1	-0.1
#5	0.6	0.7	-0.8	0.5	0.6	-0.2
#6	0.0	0.1	-1.1	-0.9	0.2	1.1
Mean	0.3	0.4	-1.0	-0.6	0.4	0.5
SD	0.5	0.4	0.4	0.7	0.2	0.5
RMS	0.5	0.5	1.2	0.9	0.4	0.7

Abbreviations: SD standard deviation, RMS root mean square, (positive value: under-cutting, negative value: over-cutting)

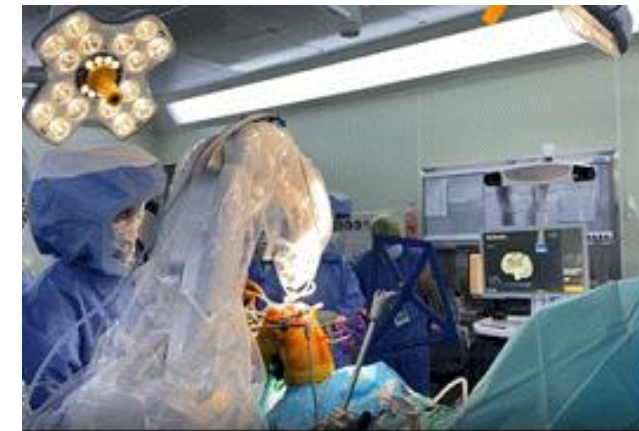
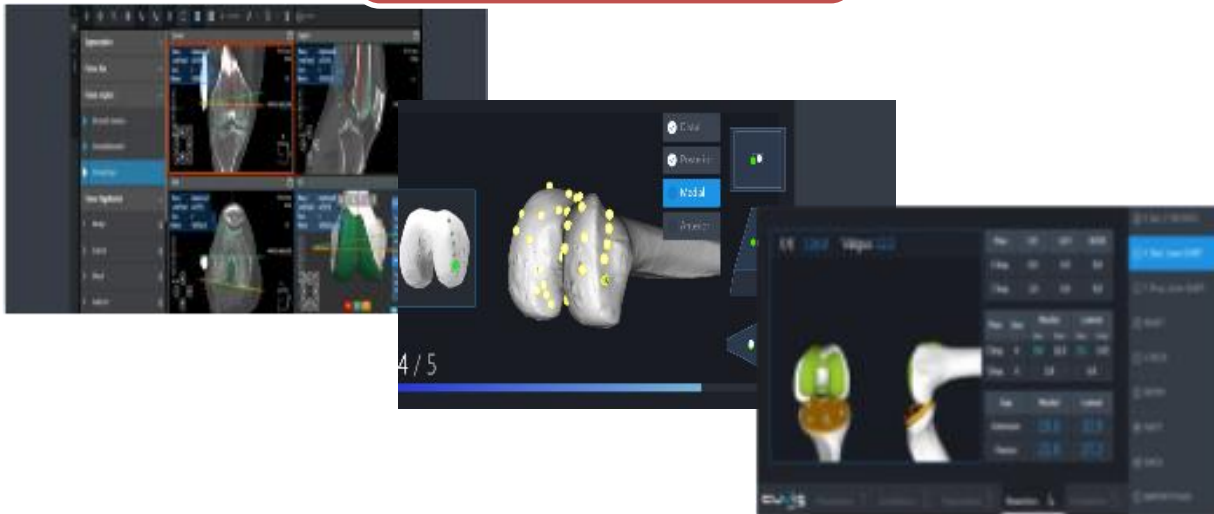
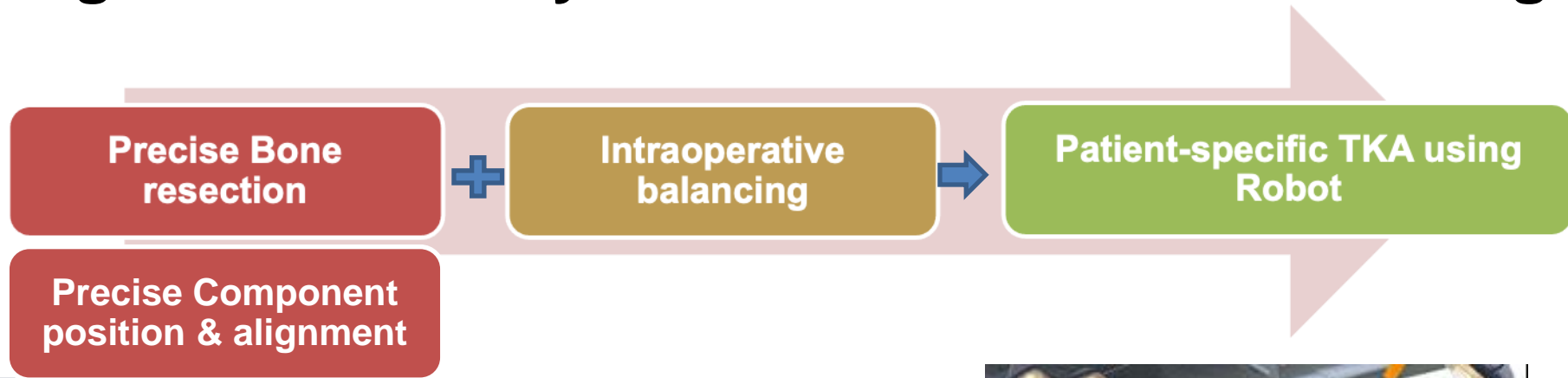
- Accuracy of angle**

Case No.	Difference between actual cutting and the plan (degrees)						
	Femur Distal		Femur Posterior		Tibia Proximal		HKA
	V/V	F/E	I/E	F/E	V/V	F/E	V/V
#1	0.2	-0.1	-0.5	-0.6	0.1	-0.8	0.2
#2	-0.1	-0.1	-0.3	-0.1	0.3	0.1	0.2
#3	0.1	0.3	0.0	-0.4	0.5	0.7	0.6
#4	0.0	0.0	-0.8	-0.3	-0.3	-0.8	-0.2
#5	0.0	0.0	-1.3	-0.8	-0.9	-0.2	-0.9
#6	0.3	-0.1	-0.3	-0.9	1.0	-0.1	1.2
Mean	0.1	0.0	-0.5	-0.5	0.1	-0.2	0.2
SD	0.1	0.2	0.4	0.3	0.6	0.5	0.7
RMS	0.1	0.2	0.7	0.6	0.6	0.6	0.7

Abbreviations: V/V varus or valgus (positive value: varus, negative value: valgus), F/E flexion or extension (positive value: flexion, negative value: extension), I/E internal or external (positive value: internal, negative value: external), SD standard deviation, RMSE root mean square, HKA Hip-Knee-Ankle angle

Conclusion

- **Robotic TKA with advanced active robotics**
 - ✓ **High degree of accuracy in resection thickness and alignment**



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***Thank you
for your attention.***

