

A Comparative Study

Robotic-Assisted Unicompartmental Knee Arthroplasty Shows Better Short-Term Results Than Conventional Technique.

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Faculty Disclosure Information

- David Figueroa, MD
 - Stryker Consultant



Introduction

Robotic Arm-Assisted Unicompartmental Knee Arthroplasty (UKA)

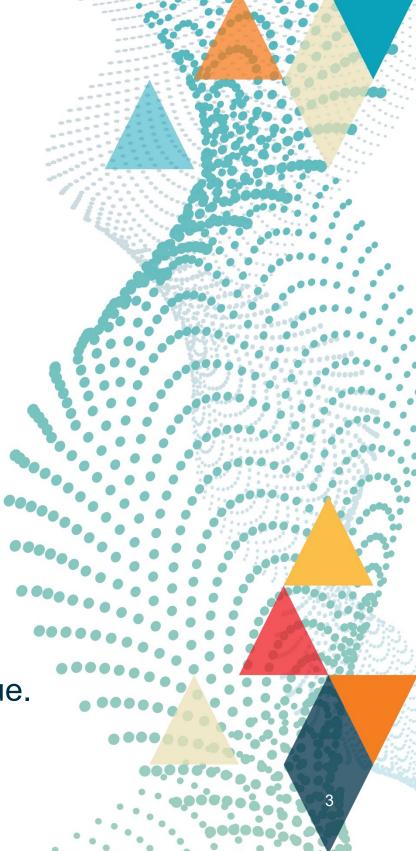
- Consistent component positioning
- Reliable preoperative planning
- Intraoperative adjustment

Literature: RA-UKA vs Conventional Technique (CT)

- Better alignment, accuracy, component positioning and sizing
- Better short-term functional outcomes
- Increased operative time
- Increased intraoperative bleeding

Objective: Compare our short-term experience on patients with a robotic assisted UKA versus UKA with conventional technique.







Materials and Methods

- Retrospective comparative study.
- Robotic-assisted UKA (MAKO, Stryker Corporation, Mahwah, NJ, USA)

Inclusion criteria	Exclu	
Unicompartmental osteoarthritis	Unicompartmental	
Conventional technique and robotic assisted UKA	Concomitant	
Same center: Clínica Alemana de Santiago		
Complete medical records		

Unicompartmental patellofemoral osteoarthitis

Concomitant surgical procedures

Revision surgery

- Data Collection: records were reviewed to document demographic data and both intraoperative and postoperative results during hospitalization.
- Statistical analysis: Fisher's test, t-student, logistic regression for significance of 5% (p<0.05).

Results

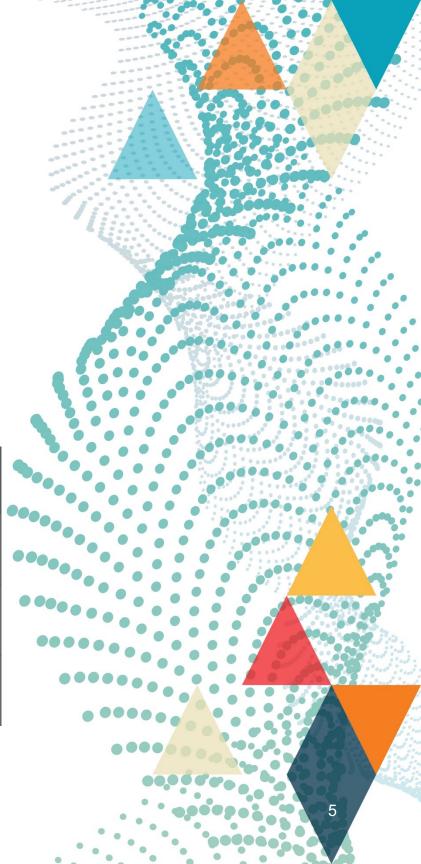
164 patients:

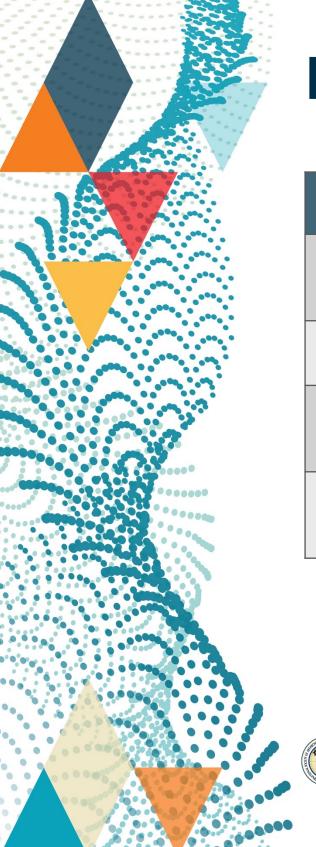
- 44 robotic assisted UKA (RA-UKA)
- 120 conventional technique UKA (CT-UKA).

There were no significant differences in both groups according to age and gender.

	RA-UKA	CT-UKA	р
Number of patients	44	120	-
Age (years)	63.13 (SD 10.75)	65.73 (SD 11.04)	0.90
Gender (male)	50%	55.8%	0.596



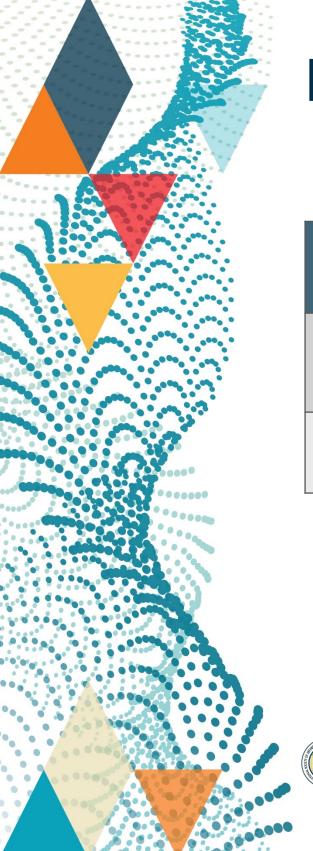




Results

	RA-UKA	CT-UKA	р
Tourniquet time (min)	79.33 (SD 16.96)	77.09 (SD 26.06)	0.99
Operative time (min)	104.8 (SD 17.94)	126.82 (SD 36.54)	0.003
Intraoperative bleeding (ml)	111.54 (SD 75.26)	190.63 (SD 91.61)	0.001
Blood cells transfusion	0	0	-





Results

	RA-UKA	CT-UKA	р
Walking same day of surgery (%)	34.09	10.83	<u>0.001</u>
Hospital stay (days)	2.61 (SD 2.19)	3.68 (SD 3.38)	0.0001

Discussion

Goh, et al 2022

- RA-UKA → Longer surgical time; Lower total costs
 Kunze, et al 2021
- RA-UKA → <u>Lower complication rate</u>; <u>Longer surgical time</u>
 Negrín, et al 2020
- RA-UKA → Better component positioning; Better alignment;
 Better component sizing; No long-term differences
 Negrín, et al 2021
- RA-UKA → Better radiological parameters; <u>Better clinical</u> outcomes and less short-term pain



Discussion

Chin, et al 2020

 RA-UKA → Better component alignment; Longer surgical time; Better short-term clinical outcomes; Improved ROM and lower revision rate (not statistically significant)

Wu, et al 2021

RA-UKA → Better component positioning and alignment;
 Longer operative time; Increased intraoperative bleeding
 Gaudiani, et al 2022

RA-UKA → Better outcomes in short and medium term



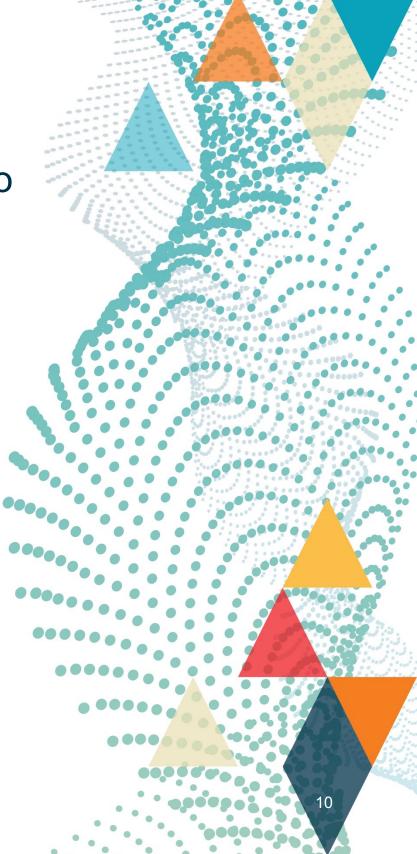
Conclusion

Robotic-assisted unicompartmental knee arthroplasty proved to be superior to conventional technique with:

- 1. Decreased operative time
- 2. Less intraoperative bleeding
- 3. Shorter time to start walking
- 4. Earlier discharge

These findings suggest that RA-UKA is a more cost-effective surgery than conventional UKA.





References

- Negrín R, Ferrer G, Iñiguez M, Duboy J, Saavedra M, Larraín NR, Jabes N, Barahona M. Robotic-assisted surgery in medial unicompartmental knee arthroplasty: does it improve the precision of the surgery and its clinical outcomes? Systematic review. J Robot Surg. 2021
- Chin BZ, Tan SSH, Chua KCX, Budiono GR, Syn NL, O'Neill GK. Robot-Assisted versus Conventional Total and Unicompartmental Knee Arthroplasty: A Meta-analysis of Radiological and Functional Outcomes. J Knee Surg. 2021
- Wu C, Fukui N, Lin YK, Lee CY, Chou SH, Huang TJ, Chen JY, Wu MH. Comparison of Robotic and Conventional Unicompartmental Knee Arthroplasty Outcomes in Patients with Osteoarthritis: A Retrospective Cohort Study. J Clin Med. 2021
- Goh GS, Haffar A, Tarabichi S, Courtney PM, Krueger CA, Lonner JH. Robotic-Assisted Versus Manual Unicompartmental Knee Arthroplasty: A Time-Driven Activity-Based Cost Analysis. J Arthroplasty. 2022 Jun;37(6):1023-1028.
- Kunze KN, Farivar D, Premkumar A, Cross MB, Della Valle AG, Pearle AD. Comparing clinical and radiographic outcomes of robotic-assisted, computer-navigated and conventional unicompartmental knee arthroplasty: A network meta-analysis of randomized controlled trials. J Orthop. 2021 May 13;25:212-219.
- Negrín R, Duboy J, Reyes NO, Barahona M, Iñiguez M, Infante C, Cordero JA, Sepulveda V, Ferrer G. Robotic-assisted Unicompartmental knee Arthroplasty optimizes joint line restitution better than conventional surgery. J Exp Orthop. 2020 Nov 30;7(1):94.
- Gaudiani MA, Samuel LT, Diana JN, DeBattista JL, Coon TM, Moore RE, Kamath AF. 5-Year Survivorship and Outcomes of Robotic-Arm-Assisted Medial Unicompartmental Knee Arthroplasty. Appl Bionics Biomech. 2022 May 6;2022:8995358.

