

Does Robotic Assisted Unicompartmental Knee Arthroplasty Restore Native Joint line More accurately than with Conventional Instruments ?

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Introduction

Unicompartmental Knee Arthroplasty (UKA) has shown promising outcomes

- Result of continuous improvements in the techniques and technology

Robotic assisted UKA has gained popularity

- Standard of care at high volume centers
- **Consistently repeatable and allows for a predictable endpoint**
- Early results have been promising

Altered Jointline after Arthroplasty : Poor outcomes, Higher failure

- **Our Study aims to:**
 - Determine accuracy of Handheld Robot assisted UKA
 - Confirm higher pre-planned component placement with semi autonomous hand-held robotic device
 - Verifies whether accuracy translates to precise joint-line restoration

Materials and Methods



Patients with Medial compartment OA, clinically diagnosed and found suitable for UKA



Surgeries were performed by senior surgeons experience with robotic technology



All patients were investigated with preoperative AP along with lateral radiographs.

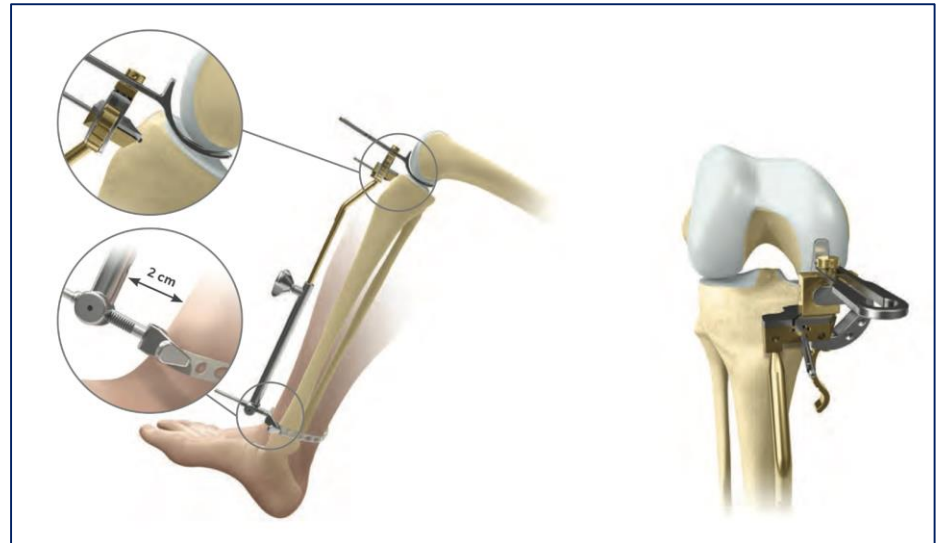
Randomised Prospective Cohort Study 2017

Number of Knees	100		
Group A Fixed bearing (<i>Robotic assisted</i>)	50 knees		
Group B Mobile bearing (<i>Conventional</i>)	50 knees		
Measurements	Weber's method		
Radiographs	Post op Lat & AP X rays		
Variable	Group A	Group B	p value
Number	50	50	
Age (years) Mean , range	57.7 (41-80)	59.9 (45 – 79)	0.6732
Gender (M:F)	20:30	23:27	0.1409

Group A :
Handheld semi-autonomous robot
Fixed bearing UKA



Group B :
Conventional UKA instrumentation
Mobile bearing UKA



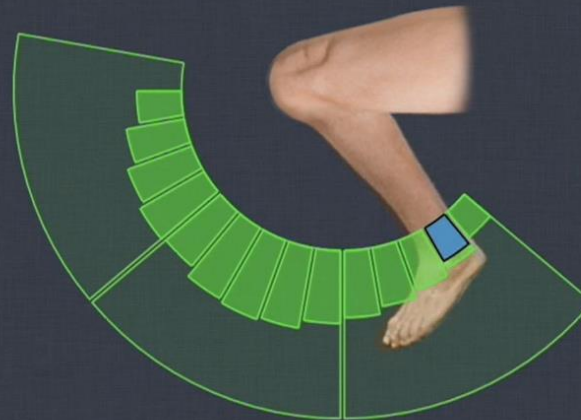
Group A : Handheld semi-autonomous robot Fixed bearing UKA

Pre op valgus stress view & correctable deformity



Stressed ROM Collection

Apply valgus stress while flexing the leg.
Press and hold the right footpedal to collect stressed ROM.



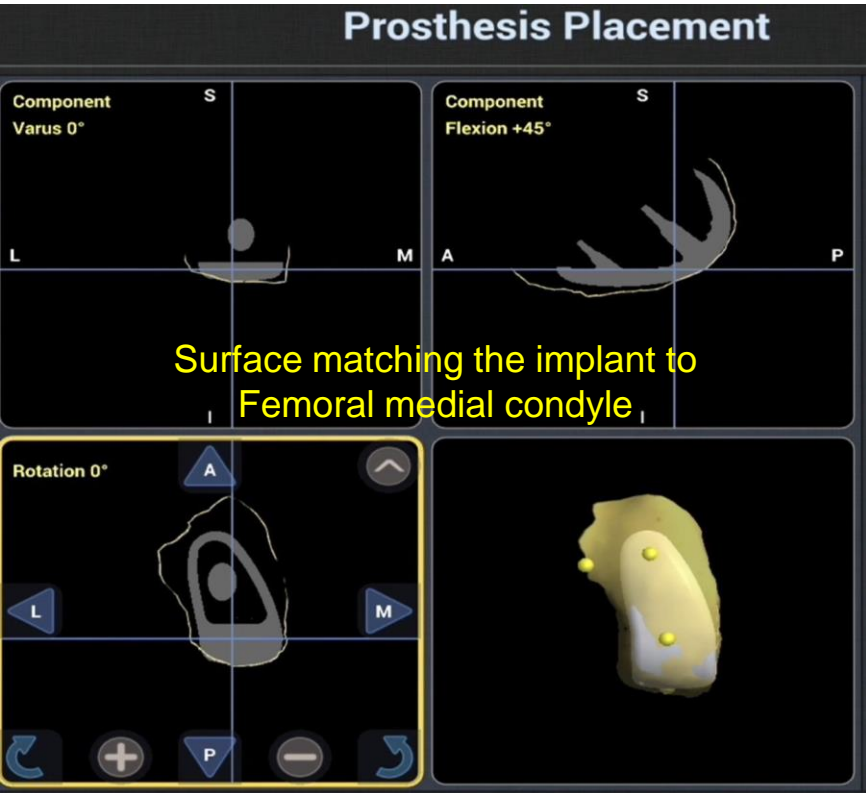
Real time Quantification medial joint space

Reset



Release to Stop

Intra operative planning



Measurements

- Image J (NIH, Bethesda MD)
 - Weber method to calculate joint line height.
 - If within 2 mm* of native joint, Successful joint line restoration
- * thickness of hyaline cartilage

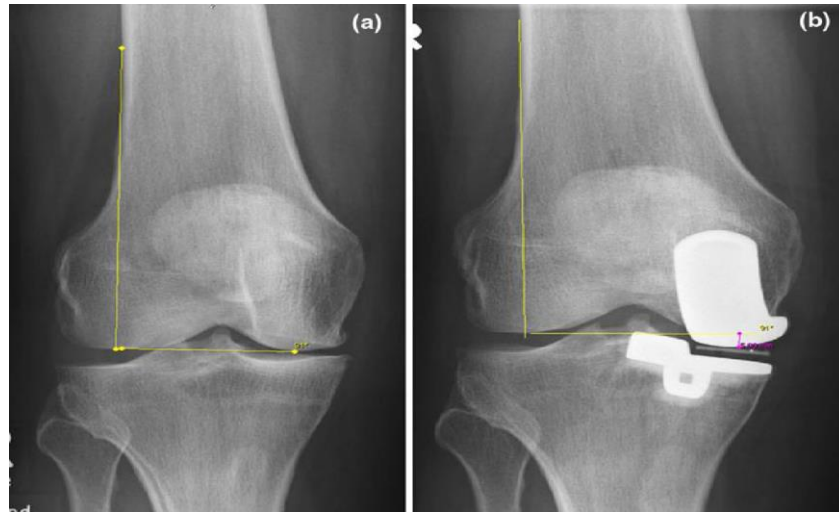


Fig: 1 (a,b) Angle defined as a line joining the most distal points of both condyles of femur and a second line tangent to the lateral cortex

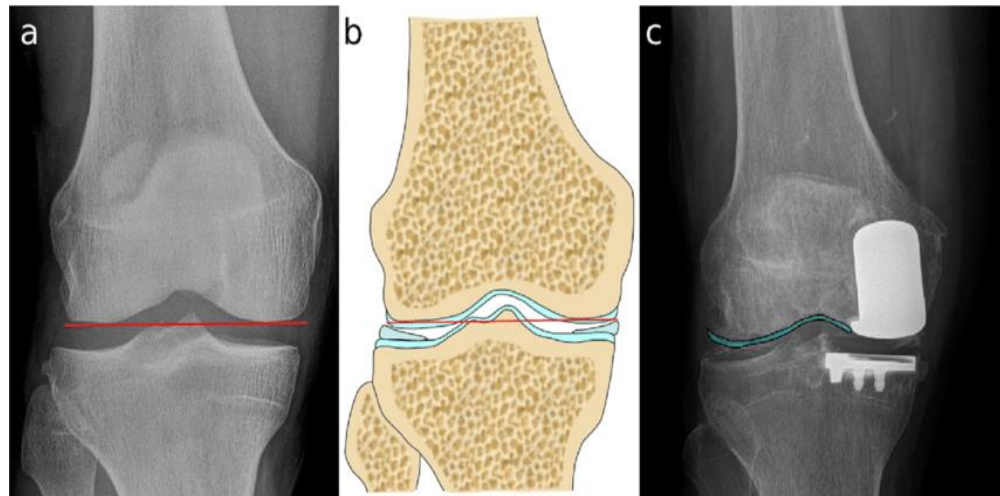
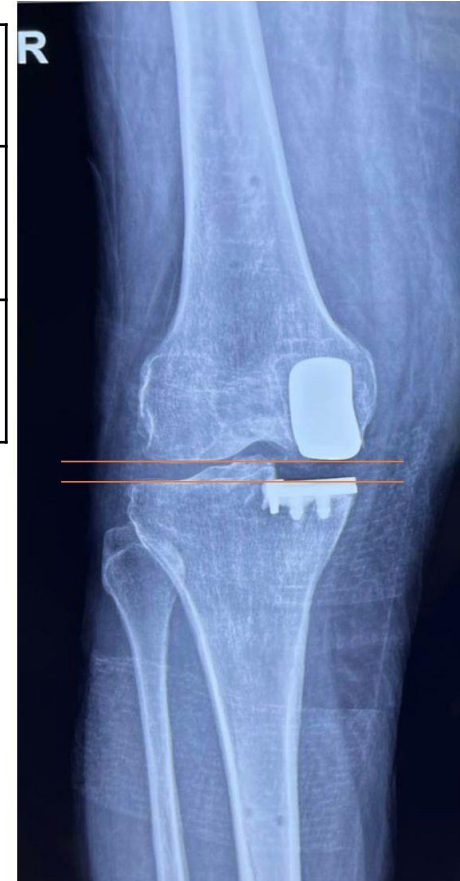


Fig :2

Results

Weber method	Group A (< 2mm)	Group B (< 2mm)	p value	Inter- & Intra Observer results
Mean ± SD	1.6 ± 0.49 (32/50)	2.47 ± 0.51 (9/50)	<0.005	0.76 (Internal consistency)
Odds Ratio (95% CI)	0.8 – 2.4 (mm)	1.6 – 3.9 (mm)		



The femoral component distal positioning was higher in Group B as compared to Group A

Group A : handheld semi-autonomous robot Fixed bearing UKA

Group B : conventional UKA instrumentation Mobile bearing UKA

Conclusion

- The meticulous planning and attention to ligament balancing in the Robotic-assisted UKA not only increases the surgical accuracy in implant positioning but also achieves better native joint line.
- Restoration and balancing compared to conventional UKA technique.
- The cohort needs to be followed for a longer duration to validate the longevity and survivorship.

References :

1. Van der List et al ; Why Do Medial Unicompartmental Knee Arthroplasties Fail Today? J Arthroplasty May 2016 PMID: 26725134
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