

ABSTRACT

We have carried out the first ever Randomised Controlled Trial (RCT) comparing robotic assisted and manual Unicompartmental Knee Arthroplasty (UKA). We have previously reported that robotic surgical assistance produces significantly more accurate implant positioning, that early post-op pain is decreased from day 1 through to week 8 and there is better function at 3 months. We now report on the 2 year clinical outcomes of the trial

BACKGROUND

UKA for treatment of medial compartment osteoarthritis (OA) has many potential benefits over total knee arthroplasty, but UKA has a higher revision rate. Robotic assisted UKA offers more accurate implant positioning and limb alignment, and lower early post-operative pain, but evidence related to functional outcomes is lacking.

METHODS AND MATERIALS

139 patients were randomised to receive UKA with or without the aid of robotic assistance. Patients were assessed at 3 months and 1 and 2 years post-op. The outcome was assessed using the American Knee Society Score (AKSS), Oxford Knee Score (OKS), Pain VAS, Forgotten Joint Score (FJS), complications and adverse events.



RESULTS 1

2 years	Robotic-arm assisted (n=58)	Manual (n=54)	
AKSS (0-200)			
Median (Q1, Q3)	168.0 (141.0, 191.0)	173.0 (162.3, 185.5)	p=0.951
OKS (0-48)			
Median (Q1, Q3)	39.0 (32.8, 45.0)	40.0 (35.8, 44.0)	p=0.965
FJS			
Median (Q1, Q3)	55.2 (23.3, 81.8)	54.1 (37.0, 79.2)	p=0.937
Pain VAS (0-100)			
Median (Q1, Q3)	3.0 (1.0, 26.0)	5.0 (2.0, 16.8)	p=0.533
Stiffness VAS (0-100)			
Median (Q1, Q3)	3.5 (1.0, 25.3)	14.5 (3.8, 31.0)	p=0.043*
Pain Catastrophizing Scale			
Median (Q1, Q3)	0.5 (0.0, 7.25)	0.0 (0.0, 2.0)	p=0.196
Range of Motion			
Median (Q1, Q3)	130.0° (117.5, 135.0)	125.0° (120.0, 130.0)	p=0.333
ROM Change: Pre-op > 2 years			
Median (Q1, Q3)	+15° (5.0, 25.0)	+10° (0.0, 20.0)	p=0.040*
Revisions	0	2	-

Table 1. Year 2 clinical results for all participants.

No difference in outcome was observed between robotic and manual surgery groups at 2 years for the AKSS. There were no significant differences in either the FJS, Pain VAS, OKS at this time point.

Subgroup analysis: For more active patients with a pre-operative UCLA activity score > 5. Patients had significantly better outcomes at 2 years in the AKSS, OKS, FJS and Stiffness VAS, if they had undergone robotic-arm assisted surgery (Figure 1).

RESULTS 2

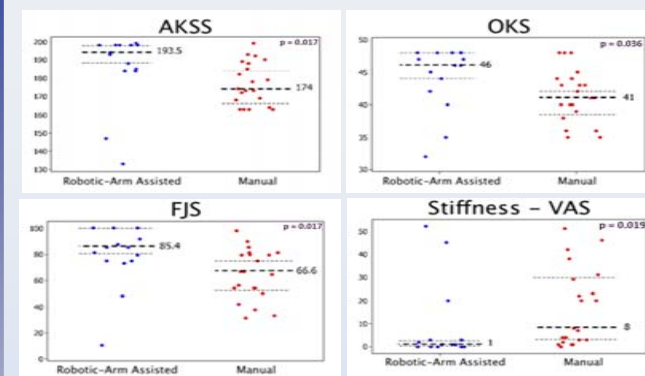


Figure 1. Median values and interquartile ranges for patients with pre-operative UCLA activity score > 5.

CONCLUSION

Our trial shows that robotic-arm assisted technology delivers a clinical outcome that is at least equivalent to a widely used UKA implant and may be superior in more active patients. There is a lower revision rate in the robotic-arm assisted group (data not shown) which may translate to longer term survivorship and reduced complications, potentially due to increased accuracy of implant positioning.

REFERENCES

- Bell SW et al. Improved Accuracy of Component Positioning with Robotic-Assisted Unicompartmental Knee Arthroplasty: Data from a Prospective, Randomized Controlled Study. *JBJS Am.* 2016;98(8):627-35.
- Blyth MJG, Anthony I, Rowe P, Banger MS, MacLean A, Jones B. Robotic-arm assisted versus conventional unicompartmental knee arthroplasty - exploratory secondary analysis of a randomised controlled trial. *BJR.* 2017;6(11):631-9.