The learning curve associated with robotic-arm assisted unicompartmental knee arthroplasty: a prospective cohort study

B. Kayani[a], S. Konan[b], J.R.T. Pietrzak[c], S.S. Huq[d], J. Tahmassebi[e], F.S. Haddad[f] – Study conducted at Princess Grace Hospital and University College Hospital, London, United Kingdom

a. MRCS, MBBS, BSc (Hons), Specialist Registrar Trauma and Orthopaedics **b.** MBBS, MD (Res), MRCS, FRCS (Tr&Orth),Consultant Orthopaedic Surgeon **c.** MBBCh, FC Orth (SA), Senior Clinical Fellow **d.** MRCS. MBBS, Clinical Research Fellow Department of Trauma and Orthopaedics, University College Hospital and Princess Grace Hospital, London, UK **e.** BSc, Extended Scope Practitioner Department of Trauma and Orthopaedics, University College Hospital, London, UK and Princess Grace Hospital,London, UK **f.** BSc MD (Res), FRCS (Tr&Orth), Professor of Orthopaedic Surgery University College London Hospitals, The Princess Grace Hospital, and The NIHR Biomedical Research Centre at UCLH, London, UK

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Goal of study

- Primary aim: determine surgical team's learning curve for introducing robotic-arm assisted unicompartmental knee arthroplasty (UKA) into routine surgical practice
- Secondary aim: compare accuracy of implant positioning in conventional jig-based UKA versus robotic-arm assisted UKA

Materials and methods

- Prospective single-surgeon cohort study
- Study groups:
  - Conventional UKA: 60 consecutive medial conventional jig-based UKAs with Oxford implant
  - Robotic-arm assisted UKA: 60 consecutive medial Mako UKAs with Restoris MCK implants
- Patient groups were well-matched for baseline characteristics including: age, BMI, and gender
- Surrogate measures of the learning curve were prospectively collected, including: operative times, accuracy of implant positioning, limb alignment, and postoperative complications
- Spielberger State-Trait Anxiety Inventory (STAI) questionnaire was collected for each case to assess preoperative stress levels amongst the surgical team

Results

- Robotic-arm assisted UKA was associated with a learning curve of six cases for operating time ($p < 0.001$) and surgical team confidence levels ($p < 0.001$)
- Cumulative robotic experience did not affect: (**Fig. 1**)
  - Accuracy of implant positioning ($p = 0.52$)
  - Posterior condylar offset ratio ($p = 0.71$)
  - Posterior tibial slope ($p = 0.68$)
  - Native joint line preservation ($p = 0.55$)
  - Postoperative limb alignment ($p = 0.65$)
- Compared to the 60 manual UKA cases, robotic-arm assisted UKA had improved accuracy to plan of femoral ($p < 0.001$) and tibial ($p < 0.001$) implant positioning
- Robotic-arm assisted UKA group had no additional risk of postoperative complications compared to conventional jig-based UKA

Conclusion

- Robotic-arm assisted UKA was associated with a learning curve of six cases for operating time and surgical team confidence levels
- Robotic-arm assisted UKA does not have a learning curve for accuracy in achieving theplanned femoral and tibial implant positioning
- There is no additional risk of postoperative complications during the learning phase of robotic-arm assisted UKA compared to conventional jig-based UKA

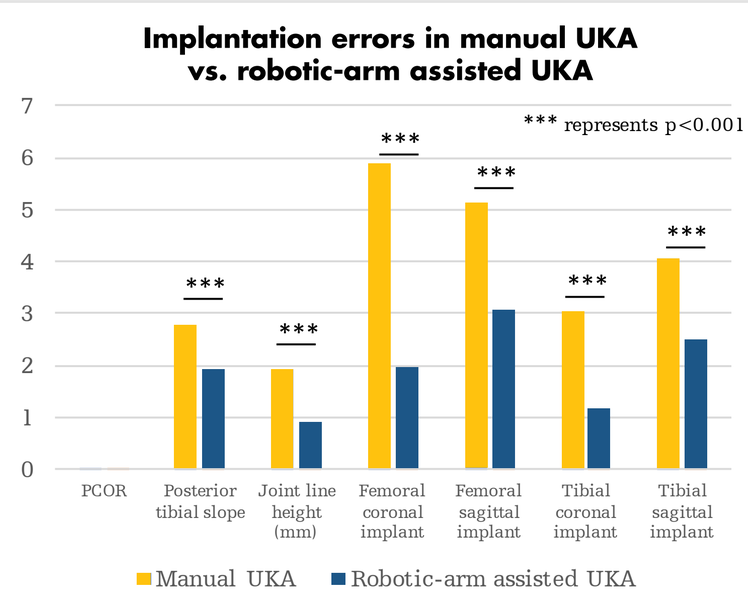

Fig. 1
Cumulative robotic experience did not affect several factors.

Reference:

Kayani D, Konan S, Pietrzak JRT, Huq SS, Tahmassebi J, Haddad FS. The learning curve associated with robotic-arm assisted unicompartmental knee arthroplasty. Bone Joint J 100-B. 2018;1033-42.