

Number Of Cases Required To Achieve Parity In Operating Time, Between Robot-Assisted And Conventional Manual Primary Knee Replacement

^{1,2}Oh KS, ¹Lee KH, ¹Ng KO

¹Island Hospital, Penang ²Department of Orthopaedics, Hospital UTAR Kampar.

INTRODUCTION:

The debut of a new surgical technique entails a learning curve that exacts an increased procedural time – one which shortens as the operator progressively gains familiarity and expertise. Robot-assisted total knee replacement (R-TKR) has been reported to require a longer surgical time compared to conventional total knee replacement (C-TKR). Vanlommen, et al¹. suggested that 6 to 11 cases would suffice before a surgeon achieves similar operating times for both R-TKR and C-TKR.

METHODS:

This was a retrospective comparative study. The conduct of this study did not breach patient confidentiality and privacy caveats. It had no bearing on how further surgeries would be conducted and bore no relationship with the management of the patient.

We started utilizing the ROSA Robotic Surgical Assistant since March 2021 and studied sixty five consecutive unilateral primary R-TKRs (Persona, Zimmer Biomet, Warsaw, IN) performed singly by three orthopaedic surgeons. The operative time was taken as the time taken from the first skin incision for tracker placement till the completion of wound closure. We then compared this to that taken for a similar number of consecutive C-TKRs. All cases received a midline incision segueing into a medial para-patellar approach. Pneumatic thigh tourniquet pressure was 150mm above the patient's mean systolic pressure. Forty nine knees were posterior-stabilised while 19, cruciate-retaining. All were cemented. We adopted the methodology of Kenanidis, et al² in their study for tabulating and computing our results.

RESULTS:

The mean operating time for R-TKR (90.2 minutes \pm 4.4 min) was significantly longer than that for C-TKR (75 minutes \pm 8.2 min) (Mann-Whitney test, $p < 0/001$). Cumulative summation plotting and sliding window technique³ comparison show that parity in time was achieved by the 52nd to 57th patient window.

DISCUSSIONS:

While the technical tracker placement and registration steps in R-TKR continue to befuddle and delay beginners, removing the need for alignment and flexion/ extension gap checks reduces operating time⁴. This advantage may be nullified by hesitancy in performing cuts on unfamiliar jigs and in "cramped" space.

CONCLUSION:

Our audit suggests a number between 17th to 19th cases (assuming for 3 equally weighted surgeons) before time parity is achieved. This study does not consider the time for pre-operative planning on the robot terminal, anthropometric differences between patients, the choice of implants, nor the nuances of individual surgeons.

REFERENCES:

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