

Short-term (3-months) functional outcomes following robotic total hip replacement surgery: a cohort study

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24th EFORT Annual Congress Vienna, 24-26 May 2023

Background

There is increasing evidence that robotic hip replacement surgery may increase the accuracy of component positioning compared to manual surgery, and accelerate recovery and return to function after surgery. However, comprehensive and prospective datasets detailing functional recovery after robotic hip replacement are lacking, especially those including both Patient Reported Outcome Measures (PROMs) and objective performance-based assessments such as walking, sit-to-stand, and stair climbing tests. Evidence from manual hip replacement studies indicates that there is often a discrepancy between PROMs and objective performance-based assessments, highlighting the need to establish a baseline for objective performance-based recovery after robotic hip replacement.

Objectives

This prospective observational study presents outcomes up to 3 months following surgery for patients who have had robotic hip replacement surgery. Surgery-related complications and readmissions are reported. Return to function is measured using performance-based assessments and Patient Reported Outcome Measures (PROMs).



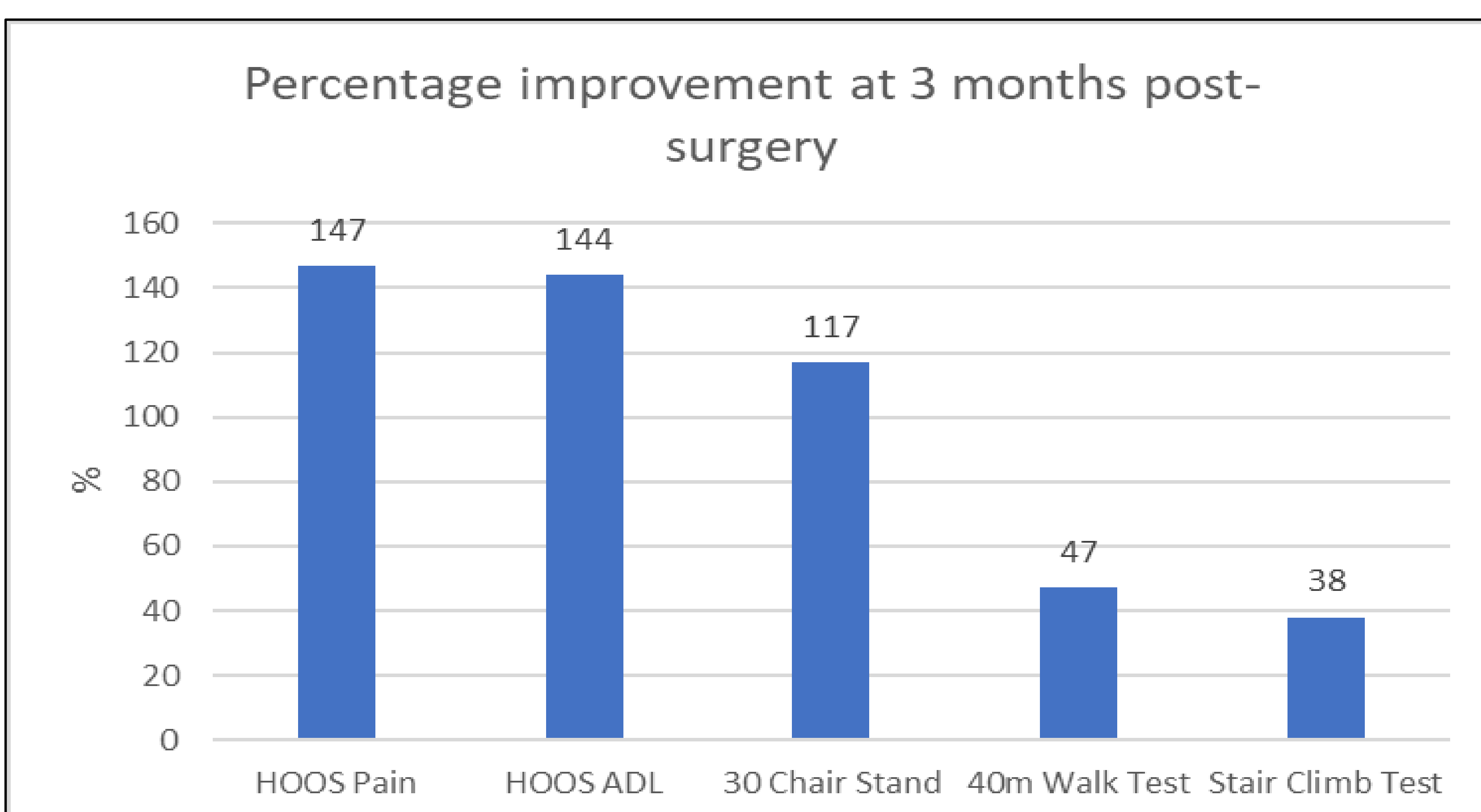
Study Design and Methods

A favourable ethical opinion for the study was obtained, and the study was prospectively registered on ClinicalTrials.gov (NCT03846791). Patients were recruited and had their routine treatment under a single surgeon at an independent UK hospital, where robotic hip replacement surgery had been adopted as routine practice since October 2017.

Recruitment was consecutive and non-selective between July 2019 to March 2020, when the Covid-19 pandemic caused the hospital and university to close. The number of cases recruited to the study before the pandemic determined the sample size for analysis. Patients were operated on using the Mako Total Hip 4.0 Robotic-Arm Assisted System, with an Exeter Stem and Trident Acetabular Shell System, using a posterior approach. Complications that required medical attention or readmission to the hospital (for at least one night's stay) were recorded for the 3 months following surgery.

Performance-based functional tests and PROMs were assessed by the study team prior to surgery, and follow-up assessments were done at three weeks, six weeks and three months. The PROMs collected were the Hip Disability, and Osteoarthritis Outcome Score (HOOS) collected at baseline, 3 weeks, and 3 months. The functional tests used were the 30s Chair Stand Test, the 40m fast-paced walk test and the 9-step Stair Climb test.

Results




Ninety-six patients were screened. Nine declined to take part in the study. Three patients withdrew from follow-up following surgery: two were unable to attend follow-up visits, and one died within the first 3 months of myasthenia gravis (the only re-admission within the 3 months follow-up). Of the 78 pts who completed follow-up, 32 patients were male, the mean age was 71.8yrs, the mean BMI was 27.2, the mean pre-surgery HOOS Pain was 45, and HOOS ADL was 46. ASA scores were: ASA1-18, ASA2-53, and ASA3-6.

Conclusions

This is the first prospective study to report functional performance after robotic hip replacement, including both PROMs and performance-based assessments. At 3 months post-op, functional performance improved markedly and was favourable in comparison to the established literature in this area for manual hip replacement.

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