# ROBOT-ASSISTED PRIMARY CEMENTLESS TOTAL HIP ARTHROPLASTY WITH A SHORT BONE-CONSERVING STEM: A PROSPECTIVE RANDOMIZED SHORT-TERM OUTCOME STUDY

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## INTRODUCTION

Recently, two topical issues in total hip arthroplasty (THA) can be a robot-assisted surgery and use of a short bone-conserving stem. However, there is a potential risk of stem malalignment, stem subsidence leading to unstable fixation, and the possibility of intraoperative femoral fracture when short bone-conserving stems are used. To address these limitations, robot-assistance could provide be a solution. The purpose of this study was to evaluate the effects of robotic milling on the accuracy of short bone-conserving stem positioning and on the short-term clinical outcome in THA using a prospective, randomized design.

## MATERIALS AND METHODS

From November 2011 to June 2012, a total of 54 patients scheduled for primary THA using a short bone-conserving femoral stem were randomised into two groups, either robotic milling group or manual rasping group. Three patients (3 hips) in the robotic milling group and two patients in the manual rasping group were lost to follow-up, leaving 24 patients (24 hips) in the robotic milling group and 25 patients (25 hips) in the manual rasping group. The Tri-Lock Bone Preservation Stem was used in all hips and all operations were performed through an anterolateral approach by one surgeon in the lateral decubitus position. New femoral fixator clamp attached to the femoral head was used to decrease soft tissue dissection and nerve injury (Fig. 1). A pinless version of the ROBODOC system using a MicroScribe 3D digitizer for femoral registration was used. The patients were assessed clinically and radiographically at 8 weeks, 5 months, 12months, and 24 months.

## RESULTS

Robotic milling group had a significantly longer operation time, requiring on average 8.9 minutes for registration and 11.2minutes for milling. On the other hand, robotic milling group showed superior results in terms of stem alignment and leg length equality. Two intraoperative femoral fractures occurred only in manual rasping group. Harris hip scores and WOMAC scores at 24 months postoperatively were similar in both groups. No complications including stem loosening, infection, nerve palsy, or dislocation encountered in either group during the follow-up period.

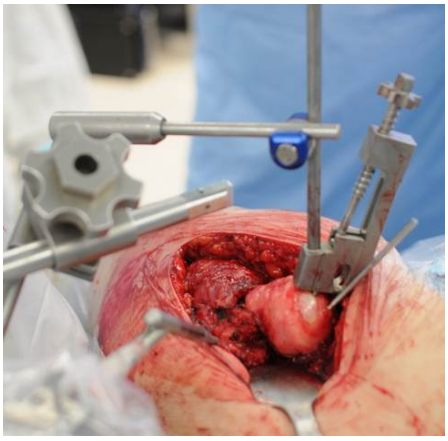

**Figure 1: Intraoperative photograph showing a new femoral fixator clamp attached to the femoral head**

## DISCUSSION

The present study suggested that robot-assisted short bone-conserving THA could increase the accuracy of stem alignment, improve leg length equality, and help reduce the risk of intraoperative femoral fracture as compared with manual rasping. However, the clinical outcome scores did not differ between the two groups at the time of short-term follow-up. Long-term follow-up is needed to determine whether there will be a long-term clinical relevance of robot-assisted implantation of short bone-conserving stems in THA.

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## DISCLOSURES


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