Robotic assisted Revision Total Knee Arthroplasty: The future of Arthroplasty

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INTRODUCTION:

Revision total knee arthroplasty (TKA) is a challenging procedure, with a high complication and failure rate. Its difficulties include limited soft tissue envelope and high rate of bone losses. Robotic assisted system has been shown to enhance the accuracy to plan and improve reproducibility in arthroplasty surgeries. However, its usage in revision arthroplasty is still limited and this technique represents an off-label utilization of this robotic assisted system.

CASE SERIES:

Case1: A 67-year-old male with history of right medial unicompartmental knee arthroplasty done by another centre in 2012, currently presented with progressive right knee pain. He elected for a conversion from a unicompartmental knee to a TKA.

Case 2: A 68-year-old female with hypertension and obesity, had a TKA done on her left knee in 2017. She presented with painful and swollen knee with multiple skin lesion secondary to insect bites around the left knee. She was diagnosed to have periprosthetic joint infection with pus in her knee joint and underwent a successful first stage revision with minimal bone loss during the explantation of her implants. Static antibiotic cement spacer was inserted and was treated with six weeks of antibiotic, before proceeding to a second stage revision for replantation of her left TKA.

Case 3: A 84-year-old male with history of left TKA done in 2011 for osteoarthritis presented with severe left knee pain after a fall. CT scan revealed two large bone cysts involving both the lateral and medial condyles of the femur, resulting in a contained bony defect in both condyles of the left femur.

Surgical Techniques:
Preoperative CT scan was done using the Stryker Makoplasty Protocol on all patients.
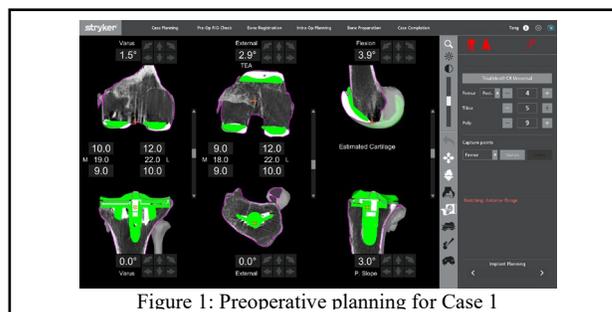

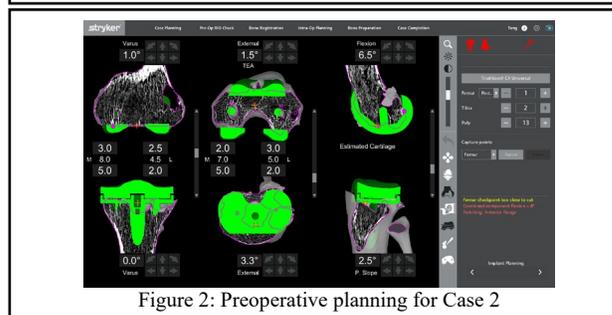Figure 1: Preoperative planning for Case 1

Figure 2: Preoperative planning for Case 2

Preoperative planning is done to achieve minimal resection at the distal lateral and medial femoral condyle to limit distal femoral bone loss. Thus maintaining the joint line level in relation to the femoral medial epicondyle and fibular head. Intraoperatively, bone registrations were done with the primary implant in-situ, followed by explantation. If an augment is needed, the resection cut can be increased intraoperatively.

CONCLUSION:

Robot-assisted revision TKA is a promising technique to improve surgical outcome by reducing bone loss and increase accuracy but further prospective studies with further development of dedicated revision software system may be needed.

REFERENCES:

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