

Comparison of Outcome and Gait Analysis after Robotic Total Knee Arthroplasty Between Mechanical and Kinematic Knee Alignment Methods with Average 8 Years Follow Up

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Summary:

No functional difference were found between two knee alignment methods durning walking.

Abstract:

Introduction

There are limited previous findings detailed biomechanical properties following implantation with mechanical and kinematic alignment method in robotic total knee arthroplasty (TKA) during walking. The purpose of this study was to compare clinical and radiological outcomes between two groups and gait analysis of kinematic, and kinetic parameters during walking to identify difference between two alignment method in robotic total knee arthroplasty.

Materials and Methods

Sixty patients were randomly assigned to undergo robotic-assisted TKA using either the mechanical(30 patients) or the kinematic(30 patients) alignment method. Clinical outcomes including varus and valgus laxities, ROM, HSS, KSS and WOMAC scores and radiological outcomes were evaluated. And ten age and gender matched patients of each group underwent gait analysis (Optic gait analysis system composed with 12 camera system and four force plate integrated) at minimum 5 years post-surgery. We evaluated parameters including knee varus moment and knee varus force, and find out the difference between two groups.

Results

The mean follow up duration of both group was 8.1 years (mechanical method) and 8.0 years (kinematic method). Clinical outcome between two groups showed no significant difference in ROM, HSS, WOMAC, KSS pain score at last follow up. The kinematic method was found to have a significantly better KSS function score than mechanical method (Classical=74.8±16.45, Anatomical=83.7±16.7, p = 0.02). Varus and valgus laxity assessments showed no significant inter-group difference. We could not find any significant difference in mechanical alignment of the lower limb and perioperative complicatoin. In addition, no significant kinematic or kinetic differences including knee varus moment (mechanical=0.33, kinematic=0.16 P>0.5) and knee varus force (mechanical=0.34, kinematic=0.37 P>0.5) were observed between mechanical and kinematic groups.

Conclusions

The results of this study show that mechanical and kinematic alignment method provide comparable clinical and radiological outcomes after robotic total knee arthroplasty in average 8 years follow-up. And no functional difference were found between two knee alignment methods durning walking.