



Kinematic Analysis of Total Knee  
Arthroplasty(TKA) Using Orthosensor System:  
Externally Rotated Femoral Prosthesis Versus  
Traditional Design Prosthesis

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**Kinematic Analysis of Total Knee Arthroplasty(TKA)  
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versus Traditional design prosthesis**

Seung-Min Na, Gun-Woo Kim, Nam-Hun Lee, Young-Woo Chung

Jong-Keun Seon and Eun-Kyoo Song

Center for Joint Disease, Chonnam National University Hwasun Hospital

**Introduction:** The purpose of this study was to elucidate kinematic change according to the implant's specific femoral rotation by using orthosensor implant with three degrees external rotation of femoral rotation rebuilt and traditional TKA implant without rebuilt of the femoral rotation.

**Methods:** Twenty-eight patients (34 knees) underwent TKA using traditional TKA implant and 16 patients (22 knees) underwent TKA using implant with three degrees external rotation of femoral rotation. Patients were followed up for at least 1 year. Mean age of patients was 71.1 years (range, 60 to 80 years) at the time of surgery. After implantation of femur and tibial components, we applied the orthosensor system, to evaluate femoral rollback of the new artificial joint. Femoral rollback was analyzed using digitized screenshot function of orthosensor system.

**Results:** Overall femoral tracking proportion regardless of implants was significantly higher on the medial compartment compared to that on the lateral compartment ( $13.3 \pm 8.4\%$  vs.  $6.3 \pm 5.0\%$ ,  $p < 0.001$ ). Regarding femoral tracking according to each compartment, externally rotated femoral prosthesis and traditional prosthesis showed  $12.1 \pm 8.2\%$  and  $14.2 \pm 8.6\%$  ( $p = 0.371$ ) on the medial compartment and  $8.0 \pm 5.8\%$  and  $5.2 \pm 4.2\%$  ( $p = 0.059$ ) on the lateral compartment, respectively.

**Conclusion:** Our study showed reverse femoral roll-back movement with higher tracking distance on the lateral compartment during TKA. externally rotated femoral prosthesis TKA system with femoral component 3-degree rebuilt showed less roll-back difference between medial and lateral compartments compared to traditional TKA system. Fortunately, both TKA systems had excellent short-term clinical outcomes without having significant difference between the two. With longer follow-up and larger cohort, the advantage and effectiveness of femoral component rotation can be elucidated in the future.

**Key words:** Femoral roll back, Kinematic analysis, Orthosensor, Total knee arthroplasty

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## Figure Legends

Figure 1. Tracking of the Femoral Component using Verasense.

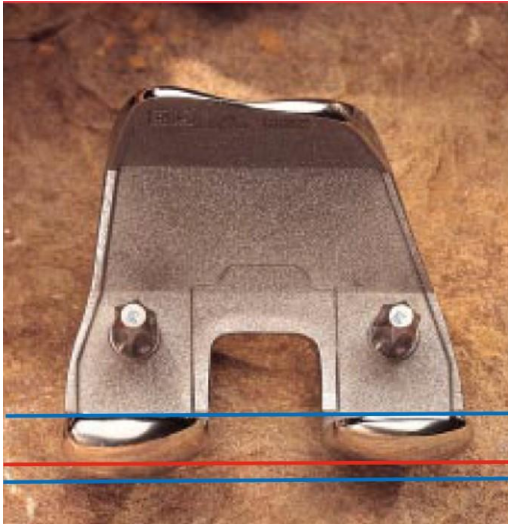


Figure 2. Femoral Rollback Analysis.

