Early clinical and radiological outcomes of navigation-guided cruciate-retaining floating platform mobile-bearing total knee arthroplasty

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Introduction: A review of the literature shows acceptable outcomes for earlier-generation TKAs over a period of up to 15 years. Over the years, various mobile-bearing prostheses have been developed as alternatives to fixed-bearing prostheses, which are limited in terms of functional performances, due to kinematic aberrations and in terms of longevity caused by wear and loosening. In recent years, the indications for TKA have been expanded to the younger and more active patients. Therefore, contemporary total knee designs continue to evolve to address the increased demands in terms of durability and function. In an attempt to meet the demand of more active patients who desire a TKA that allows for high flexion and prolonged longevity, we have been using this new floating platform prosthesis since 2003. This retrospective study sought to evaluate the early clinical and radiological outcomes of this design, specifically the cruciate-retaining (CR) type, in patients who underwent navigation-guided primary TKA with a minimum three-year follow-up.

Objective: To evaluate the early clinical and radiological outcomes of navigation-guided cruciate-retaining (CR) floating platform mobile-bearing total knee arthroplasty (TKA)

Patients & Methods: Between October 2003 and December 2008, 181 cases of navigation-guided primary TKAs using e.motion CR floating platform mobile-bearing prosthesis were performed in 132 patients. In this retrospective study, assessment of early radiological and clinical outcomes was done by analyzing the prospectively collected data of these patients with a minimum three years follow-up.

Results: Follow-up data for 132 TKAs in 97 patients was available for analysis. There were 93 women (127 knees) and 4 men (5 knees) with a mean age of 67.3 years. The mean height of the patients was 153.7 cm, the mean weight 64.7 kg and the mean body mass index 27.4 kg/㎡. There were 70 right and 62 left knees, with a pre-operative mean femorotibial deformity in the coronal plane of 6.8° varus. At the mean follow-up period of 53 months (36 to 94 months), the flexion contracture significantly improved from a preoperative mean of 10.5° (0 to 30°) to 0.6° (0 to 10°) at the last follow-up ($p < 0.05$). Although the mean further flexion increased to 125.9° (110 to 150°) at the last follow-up from 124.0° (100 to 150°) pre-operatively, this improvement was not statistically significant ($p < 0.296$). The WOMAC score improved significantly from a mean of 67.7 (60 to 77) pre-operatively to 6.4 (1 to 11) at last follow up ($p < 0.05$). Similarly, the mean HSS score also significantly improved from 61.8 (34 to 85) to 92.9 (78 to 100) postoperatively ($p < 0.05$). The mean α angle was 95.9° (90.3 to 102.4°) and the mean β angle was 89.6° (85.8 to 93.1°). The Ω angle had a mean of 5.5° (0.5 to 9.9°). The mean γ angle was 4.3° (-1.7 to 12.1°) and the mean δ angle was 86.6° (79.9 to 91.2°).

These findings suggested that the alignment of both the femoral and tibial components was tolerable. Radiolucency was found in 35 cases (more often around tibial component than the femoral one), usually without clinical symptoms of the loosening. The mean measurement of radiolucent line around the femoral component was 0.1 mm (0 to 1.1 mm), and that around the tibial component was 0.2 mm (0 to 2.9 mm), suggesting no evidence of loosening. In these 35 cases, only three cases have more than 2mm radiolucency in Zone 1 tibial component. There were no major problems with wound healing or neurovascular complications. Neither were there any complications of dissociation or breakage of the polyethylene liner. However, five knees had required re-operation, three because of distal femoral fracture, and two for infection.

Conclusion: Navigation-guided TKAs using e.motion CR floating platform mobile-bearing prosthesis can produce satisfactory early clinical and radiological outcomes with a relatively low complication rate.