

Computer assisted UKR: a prospective randomized study using a dedicated software

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Introduction: Despite clear clinical advantages Unicompartmental Knee Replacement still remain an high demanding and less forgiving surgical procedure. Different Authors in literature pointed out how in coronal tibial malalignment beyond 3° as well as tibial slope beyond 7° increase the rate of aseptic failure even more than in TKR. Likewise overcorrection in the coronal plain is a well recognized cause of failure because of an overweighting on the contralateral compartment. Furthermore it has been shown how in UKR surgery even using short narrow intramedullary guide this can cause errors in both coronal planes. Computer assisted surgery has been proposed to improve implant positioning in joint replacement surgery with no need of intramedullary guide. Unfortunately no clear clinical advantages have been demonstrated in TKR using navigation with a theoretically long term benefit because of a decreased number of revision. However more evident advantages could be predicted in a more demanding surgery where accuracy is still far using traditional techniques such as in UKR surgery.

Aim of the study is to present a prospective randomized study comparing 2 groups of UKR s using either a computer assisted technique or a free-hand technique

Materials & Methods: Since January 2010 68 patients undergoing UKR with the same implant (ZUK, Zimmer, Warsaw, Indiana, USA) have been enrolled in the study prospectively. Before surgery patients were alternatively assigned to either the traditional or computer-assisted alignment group. In the group A (34 knees) the implant was positioned using a CT-free computer assisted alignment system specifically created for UKR surgery (Navitack Sasamoid P4, Zimmer; Warsaw, Indiana, USA) while in group B (34 knees) a traditional technique based on an extramedullary tibial guide was adopted. The duration of surgery and all the complications according to Kim classification were documented in all cases. Six months after surgery each patient had long-leg standing anterior-posterior radiographs and lateral radiographs of the knee. The radiographs were assessed to determine the frontal femoral component angle (FFC), the frontal tibial component angle (FTC), the hip-knee-ankle angle (HKA) and the sagittal orientation (slope) of both tibial and femoral component. The number and percentage of outliers for each parameter was determined. In addition the percentage of patients from each group with all 5 parameters within the desired range was calculated.

Likewise at a mean follow-up of 12.1 months both the groups were clinically assessed using KSS and functional score

Results: At the last assessments there were no differences in the clinical outcome. The mean surgical was longer in the navigated group of a mean of 7.3 minutes without any statistical differences in complications. The mechanical axes, tibial slope the FTC angle were significantly better aligned in the navigated group. A statistically significant higher number of outliers was seen in the free-hand group. The number of implants with all 5 radiological parameters aligned within the desired range was statistically higher in the navigated group. All the implants in the navigated group were correctly aligned in all the planned parameters.

Discussion: To our knowledge this is the biggest randomized study in literature assessing computer assisted UKRs compared to traditional technique. Despite a slight longer surgical time, the results demonstrated an evident improved implant alignment with a statistically significant reduction in the number of outliers in the computer-assisted technique with no differences in number of complications. The Authors believe navigation even more helpful in UKR than in TKR because of a higher demanding and less forgiving surgery.

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