Reviewer’s report

Title: Prosthesis Alignment Affects Axial Rotation Motion after Total Knee Replacement: A Prospective In vivo Study Combining Computed Tomography and Fluoroscopic Evaluations

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Reviewer: Jörg Goldhahn

Reviewer’s report:

The authors address a clinically relevant question in their study: ... “whether component malalignment and mismatch affect axial rotation motions during passive knee flexion after TKR.” Whereas the first part relates to the clinical problem, the second part already represents a limitation. However, the focus on passive knee flexion enables standardization of the in-vivo trial but the consequences for gait and other activities of daily living remain unclear. The authors clearly mention this limitation and indicate ongoing research in this area. Therefore, the manuscript adds knowledge due to the simplified test procedure compared to a full gait analysis. Could the authors provide some thoughts how the observed patterns may influence the full gait cycle? Since the authors used a forced passive flexion there remains the question, whether a similar pattern will result from active flexion.

One uncertainty in the manuscript is the definition of “outliers”. Could the authors provide more rationale for choosing this threshold?

The chosen methodology is appropriate, well described, and referenced but a short summary of the processing steps of the fluoroscopy would increase understanding of the paper.

In the first paragraph of the methods section the authors describe a very small variability of the surgeons with respect to alignment in different planes. Could the authors please comment on the high percentage (31%) of outliers?

At the moment the conclusion section represents a summary. The authors should either label it as summary or derive specific conclusions.

Specific comments:

Do the two cohorts (all subjects vs. kinematic cohort) really have the same age characteristics?

Could the authors superimpose the resulting curves of total rotation (4 and 5 as well as 6 and 7)?

Legends for figures 6 and 7 are missing

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable
**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

'I declare that I have no competing interests.