Author's response to reviews

Title: Retention of the posterior cruciate ligament versus the posterior stabilized design in total knee arthroplasty: a prospective randomized controlled clinical trial

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Author's response to reviews: see over
Dear Editors,

Thank you for considering our manuscript for publication in BMC Musculoskeletal Disorders. Hereby, we submit our revised manuscript.

This letter gives a description of our revisions in a point-by-point response to the concerns of the reviewer.

1a. Why the author choose Anatomic Graduated Component?

We added the following information to the Methods section (Intervention) of the revised manuscript:

The Anatomical Graduated Component (AGC; Biomet, Inc, Warsaw, IN, USA) has been successfully used in our hospital for over 20 years. We specifically choose this implant since we have very good experiences with it, with a high survival rate. Worldwide it has been implanted since 1983 with 95-98% survivorship at 15 years. Several AGC studies have demonstrated these results.\cite{Emerson:2000, Ritter:2001, Worland:2002}.

We added the following information to the References section of the revised manuscript:


1b. What’s the design of the implants and does it have any difference between itself and other implants?

We added the following information to the Methods section (Intervention) of the revised manuscript:

The AGC consists of a one-piece molded polyethylene tibial component with a durable cobalt chrome femoral component. Regarding the differences between the AGC designs, the posterior cruciate retaining (PCR) design has a posterior cut-out for the posterior cruciate ligament and relatively flat topography. This allows for posterior roll-back of the femur when the knee is flexed and the posterior cruciate ligament is tensioned. In the posterior stabilized (PS) design the stabilization is achieved by a "cam and post" mechanism added to the prosthesis components. This mechanism replaces the function of the posterior cruciate ligament. The femoral component has a transverse cam added to the backside of the prosthesis. The tibial polyethylene plate has a central polyethylene post placed on the middle of the plate. In the assembled total knee, the cylindrical cam comes against the post when the total knee bends. The post then forces the cam backwards preventing the
forward glide of the femoral component. In this way the posterior stabilized total knee replaces the function of the posterior cruciate ligament.

PCR and PS designs from other implants are based on the same biomechanical principles as described above, although there might be some slight differences in design, surgical technique and materials used among different manufacturers. One main advantage of our study, and in which our study differs from others, is that we compare one AGC design with another design of the same implant, which minimizes the variables that differ between the two groups of patients, especially with respect to surgical technique and materials used.

2. About the intervention, what does anteromedial arthrotomy mean? Which approach was chosen?

We added the following information to the Methods section (Intervention) of the revised manuscript:

The surgical procedure consists of a midline approach. After the midline skin incision has been made over the knee joint, the capsule of the joint is exposed. By incising the joint capsule, the arthrotomy is performed. The capsule is incised anteriorly, just superior to the patella, curving medially from the patella and back down anteriorly, just medial from the patellar ligament.

3. The rehabilitation program should be more detailed described.

We added the following information to the Methods section (Intervention) of the revised manuscript:

All patients will be treated with the same, standardized protocol postoperatively, in terms of analgesia and mobilization. Subcutaneous low molecular weight heparin is given for 6 weeks postoperatively as prophylaxis against thrombosis. At day one after surgery, physiotherapy is started and patients are mobilized with the aid of two crutches. When patients are able to walk stairs and make transfers to bed and toilet, and when the knee flexes at least 90 degrees, they are discharged from the hospital. Physiotherapy will be continued in the home situation for another 6 weeks.

4. A successful PCL-retaining type TKR depends on an Intact and Strong PCL. Does the author take this factor into the study? If you plan to perform a PCL-retaining TKR, and the severe degeneration of the PCL was found during operation, will you perform the same procedure? I think this point should be mentioned in the article.

The reviewer is right that this is an important point and that information on the way we have planned to take this in account is missing in the manuscript. We therefore added the following text to the Methods section (study population) of the revised manuscript:

If perioperatively an insufficient posterior cruciate ligament is found, the patient will receive a posterior stabilized total knee prosthesis. Analyses will be done according to the intention-to-treat principle, with a sub-analysis excluding these conversions. As the incidence of an insufficient posterior cruciate ligament is higher in patients with secondary osteoarthritis of the knee, rheumatic diseases and a fixed varus or valgus deformity of over 10 degrees, these are exclusion criteria of our study.
We removed the following information from the Acknowledgements section of the revised manuscript:

The study is partly funded by Biomet Netherlands. Biomet has no role in the collection, management, analysis, or interpretation of the data, or the preparation, review or approval of the manuscript.

We hope our revised manuscript will be suitable for publication within the Study protocol section.

Sincerely,

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