Author’s response to reviews

Title: A Case of Bilateral Revision Total Knee Arthroplasty Using Distal Femoral Allograft-Prosthesis Composite and Femoral Head Allografting at the Tibial site with a Varus-valgus Constrained Prosthesis: Ten-year Follow up

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Author’s response to reviews:

Thank you for giving us the opportunity to submit a revised version of our manuscript, now titled “Bilateral Revision Total Knee Arthroplasty Using Distal Femoral Allograft–Prosthesis Composite and Femoral Head Allografting at the Tibial site with a Varus-valgus Constrained Prosthesis: Ten-year Follow up.” The manuscript ID is BMSD-D-17-01202.

We have carefully considered all the reviewers’ comments and suggestions, and we have revised our paper accordingly. The comments were very helpful, and we appreciate the constructive feedback on our original submission. We think that the quality of the revised manuscript has improved considerably, and we hope that you agree. We have provided detailed responses to each of the questions or comments in red text.

We hope that the revised manuscript is now suitable for publication in your journal.

I look forward to your reply.
Yours sincerely,

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● Reviewer 1:

Line 96

'No study has reported the use of distal femoral APC in bilateral RTKA' - it's not appealing to readers. Do you have any interesting 'stories' regarding this bilateral case?

→ Thank you for your comment. I changed the sentence to “the majority of knee surgeons prefer metal augmentation, rotational hinge, and giant prosthesis when extensive bone loss occurs after TKA, but APC is used in this study.”

Page 4, lines 95

Line 166

'The patient is in satisfactory condition and had a in normal daily life.' - As a scientific report you should include some objective insights rather not mentioning it was just right, i.e. assessing the patient using a scoring system like KSS or OKS.

→ Thank you for your comment. I have added content to the text.
At the postoperative HSS score increased from 25/38 to 80/86.

Page 6, lines 168

Line 169

'Bone loss after RTKA results from…' - Bone loss appears to be found during RTKA not after RTKA. It may lead readers' misconception.

→ Thank you for your comment. I changed the sentence as you had recommend. I also think It’s right.

Page 7, lines 173

Line 175

'A few studies have also reported using either massive distal femoral and proximal tibial allografts for large defect reconstruction in RTKA.' - I don't understand this sentence. Please clarify.

→ Thank you for your comment. I changed the sentence to “There are few studies that simultaneously reconstruct large bone defects of distal femur and proximal tibia using allografts in RTKA.”

Page 7, lines 180

Line 180

'APC offer superior healing capacity compared to host bone because of less rotational stress.' - It should be written as 'APC offers great healing capacity in terms of attaching to the host bone, which contributes to avoid massive rotational stress between them.'
'Moreover, stability is enhanced by attaching the lateral ligament of allograft bone to the remaining epicondylar bone, resulting in less limitation of ROM than with a rotating hinge.' - Is that really? You should add some references at least to justify this statement.

→ Sorry. Farfalli GL, et al. Comparison of Constrained and Semiconstructed Knee Allograft-Prosthesis Composite Reconstructions. (Sarcoma. 2013: 489652), but it is not suitable for the above because it is compared with nonconstrained APC and constrained APC. I was mistaken. Therefore, I will delete this content.

Your discussion is somewhat irrelevant for this case report. As mentioned above, you should rather discuss the strength and weakness of the technique in comparison with other therapeutic options referencing other literature.

→ Thank you for your comment. We supplemented the discussion.

- In the case of relatively small size bone defects, filling a cement, impaction bone graft or metal augment can be used. In this case, this method could not be used because it was an uncontained type bone defect of entire femoral condyle. And compared to rotational hinge prosthesis and megaprostheses, which are commonly thought of as large bone defects in general APC offers great healing capacity in terms of attaching to the host bone, which contributes to avoid massive rotational stress between them. Also, in our case, the anterior cortex of the distal femur was too slender and a rotating hinge prosthesis was not appropriate. In the megaprostheses has the disadvantage of additional bone resection, reconstruction of the patella tendon may be difficult.
when using the proximal tibial component, and it is relatively difficult to preserve the original joint line. In addition, since the host bone is designed according to the prosthesis, bone loss may be greater than APC, which designs the prosthesis according to the host bone. Therefore, we used APC and there was no problem after 10 years of follow-up. However, disadvantages are not commonly available, the early recovery of range of motion and slower full weight-bearing compared to other methods. So, this case was non weight-bearing for 6 weeks after surgery, followed by 6 weeks of partial weight-bearing, then full weight-bearing with a walker starting at 12 weeks postoperatively.

Page 7, lines 183

- Reviewer 2:

1. The authors should explain the preoperative planning for management of bone defects visually in an easy-to-understand way.

→ Thank you for your comment. I have added content.

Anteroposterior and lateral radiographs revealed severe osteolytic bone defects in both the femoral and tibial aspects, along with primary total knee prosthesis and dissociation and subluxation of bilateral implants. Moreover, there were severe osteolytic lesions around the femoral prosthesis and along the femoral shaft on computed tomography. Preoperative bone scan and laboratory data ruled out infection. We decided to reconstruct the left knee first, using a femoral head allograft at the tibial site, a structural distal femoral allograft at the femoral site, and a varus-valgus constrained (VVC) prosthesis (NexGen LCCK, Zimmer, Warsaw, IN, USA) with cement. Determining the size of the APC to use prior to surgery is a very important and was measured using templating on the previous radiographs. The size of the structural distal femoral allograft was determined using a templating technique before surgery.

Page 5, lines 117
2. The authors need to show the actual method to reconstruct large bone defects in the distal femur more clearly.
   
   → Thank you for your comment. The method of reconstruction of large bone defect in the distal femur using APC is described in the text and figures.

3. The authors should present the X-ray image immediately after revision total knee arthroplasty and longitudinal X-ray changes after revision-TKA.
   
   → Thank you for your comment. I have added content.

Page 6, lines 159, 164

4. The authors should summarize the previous reports of the same method and other methods for management of large bone defects in more detail.
   
   → Thank you for your comment. We supplemented the discussion.

Page 7, lines 183

5. The authors should discuss advantages / disadvantages including healing process, necessity of load restriction and postoperative rehabilitation when compared with other methods which including impaction bone grafts, mega prosthesis and cone & sleeve adaptation etc.
   
   → Thank you for your comment. We supplemented the discussion.

   - In the case of relatively small size bone defects, filling a cement, impaction bone graft or metal augment can be used. In this case, this method could not be used because it was an uncontained type bone defect of entire femoral condyle. And compared to rotational hinge prosthesis and megaprosthesi, which are commonly thought of as large bone defects in general APC offers great healing capacity in terms of attaching to the host bone, which contributes to avoid massive rotational stress between them. Also, in our case, the anterior cortex of the distal femur was too
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