Author’s response to reviews

Title: Preoperative radiographic and clinical factors associated with postoperative floating of the lesser toes after resection arthroplasty for rheumatoid forefoot deformity

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Author’s response to reviews:

Among the critical points where I indicated some leaps of logic, some of them were managed properly but some of them were not. Please address the suggestion below. The critical points that still need to be addressed are:

1) According to [Advice #1]: I admit that JSSF hallux scale consists of pain, function, and alignment; however, it is a big leap of logic that these items were considered as "risk factors" for postoperative floating toe only because you got the significant difference in JSSF scale between patients with and without the postoperative floating toe. The conclusions that you can provide from the present study is that the postoperative floating toe in the lateral lesser toes might be associated with the hallux conditions other than the degree of hallux deformity evaluated by hallux valgus angle.

Thank you for your comment. As the reviewer mentioned, we have not identified “risk factors” in this study, only different pre-operative characteristics. Identification of risk factors would require regression models and the calculation of odds ratios or a similar procedure. We have removed all references to “risk factor” and simply changed the wording.

2) According to [Advice #2]: "Recurrent floating of the lesser toes" that the authors used is incorrect because the authors did not evaluate the floating of the lesser toes preoperatively but the dislocations of the lesser toes instead. I recommend that "recurrent" will be changed to "postoperative" throughout the manuscript. And also, please check the title of tables.

Thank you for your valuable comment. I changed all the word “recurrent” to “postoperative” in our manuscript.
3) According to [Advice #4]: The elements of hallux deformity evaluated by the JSSF scale are only the presence or absence of deformity and rigidity of deformity. Though the authors showed no significant difference in the hallux valgus angle between patients with and without postoperative floating lesser toes, this does not mean that there was no significant difference in the subscale of hallux deformity of JSSF scale. The authors cannot mix up these two different measurement methods. In order to provide the conclusion like the authors did, the authors should focus and do reanalysis on the patients who have detailed information about subscales but not only the total scale.

Since cases in which only the total score was recorded were included in this study, it is impossible to discuss the subscale values in this study. As pointed out by the reviewer, we also concluded that there is a lack of logic describing our conclusion only with regard to the results of the JSSF scale. We still affirm our results that recurrent-floating in the medial column presented severe preoperative hallux valgus deformity and that recurrent-floating in the lateral column presented a worse preoperative JSSF is a very interesting finding.

Regarding the descriptions of the results of the JSSF scale, we modified our description so that it does not intentionally lead to the relation between pain and the recurrent-floating of lateral lessor toes (Line 166 – 169, 249 – 253).

4) Additional comments: The authors should provide the information about the number of patients of each group. And, how many cases were overlapped between patients with floating toe deformity in the medial column and in the lateral column? Grouped frequency table would be advisable.

Thank you very much for your suggestion. Regarding the foot with floating toes in both columns, we compared both columns by radiological and physical findings and divided them into each group (postoperative floating toes in medial column: n=17 and postoperative floating toes in lateral column: n=23). We added this information in M&Ms (Line 152 to 153) and in tables 3 and 4.

Minor comments: 1) Line 102&103: Do you mean "destruction" instead of "distraction"?

We changed the word.

2) Line 103-105: Should be written. It is unreadable.

We changed the word.

3) Line 161: Add "and" between "continuous variables" and "the chi-square test".

We added “and” as the reviewer’s suggested.
Associate editor comments:

- How did the authors define “recurrent”? Were these (1) patients who were graded as dislocated preoperatively and subsequently remained “floating” post-operatively? Or (2) could those in the “floating” post-operative group have included patients who were not dislocated pre-operatively. If (1) is correct, please explain this in the methods, however, if (2) is correct then I agree with reviewer #2 (comment #2) that these should more accurately be called “post-operative floating”. The different classification methods should also be acknowledged as a limitation.

Since we wanted to clarify the relationship between the degree of preoperative dislocation and postoperative floating of the toes, we applied this grading system (Doty JF et al., 2014) in this study. This grading system is simple and easy to understand. However, it is based on the location of proximal pharyngeal bone standardized by the metatarsal head and hence, we could not apply it for postoperative evaluations. We changed all the words “recurrent” to “postoperative” in our manuscript and added this point into the limitation section (Line 265 to 269).

- Please also explain a little more clearly in the methods why post-operative floating was used instead of the same method as the pre-operative dislocation (presumably because of inspection during surgery?)

Since this evaluation system is based on the metatarsal head, it is impossible to evaluate if it is resected (especially Grade 2 and 3). We added the explanation why we could not use the grading system after resection arthroplasty as follows:

Since preoperative grading system of the dislocation of the MTP joint is based on the metatarsal head, it is impossible to grade if it is resected (especially grade 2 and 3). Therefore, non-grounded toes while weight-bearing were defined as postoperative floating toes.

- As reviewer #2 has indicated (comment #1), you have not identified “risk factors” in this study, just different pre-operative characteristics. Identification of risk factors would require regression models and the calculation of odds ratios or similar. I suggest removing all references to “risk factor” and instead propose that you have simply found pre-operative differences and thus change the wording to that effect.

We agree with the reviewer’s suggestion and changed “risk” to other word.

- I’m not sure there is sufficient justification for subgrouping med and lateral lesser toes. In the manuscript? The medial column typically includes the first and possibly second metatarsals. Why did you not just analyse all lesser metatarsals as a group? I am happy for you to keep these subgroups if a better rationale can be provided in the introduction (and possibly methods), and some clearer explanation of how the JSSF score would affect lateral but not medial lesser toes.
Ouzounian TJ et al. clarified that the second and third tarsometatarsal (TMT) joint is stable compared with the lateral TMT joint (cuboid to fourth and fifth metatarsal bone). Hence we categorized the lesser toes into 2 groups and hypothesized that each subgroup has individual characteristics for postoperative floating toes.

Regarding the explanation of how the JSSF hallux score would affect lateral but not medial lesser toes, we speculate that the preoperative condition of the lateral lesser toes was worse because it was an outer load due to a state where no burden is applied to the nape toes (pain, range restriction, dysfunction etc.). Although we cannot completely prove our hypothesis from this result, we believe that different preoperative features in recurrent cases of medial and lateral toes are very important new trials.

We added a description of the reason why we divided them into two groups (medial and lateral columns) (Line 80-82).

• I also agree with Reviewer #2’s comments (number 3) regarding the subscales of the JSSF and referring only to the pain (and sometimes function) subscales throughout the manuscript. From the discussion, the scale appears to include ADLs, callosities, pain and ROM thus I would recommend not simply focusing on the pain element throughout the manuscript (eg abstract, discussion, conclusion) unless you compare the pain subscale scores between groups. Also, many readers will be unfamiliar with this scale so please provide a brief description in the methods.

As pointed out by the reviewer, we concluded that there is a lack of logic to reach our conclusion when referring only to the results of the JSSF scale. However, we still find interesting that results that the recurrent-floating in the medial column presented severe preoperative hallux valgus deformity, while that of the recurrent-floating in the lateral column presented worse preoperative JSSF.

Regarding the descriptions of the results of the JSSF scale, we modified our description so that it does not intentionally lead to a relation between pain and the recurrent-floating of the lateral lesser toes (Line 50 – 52, 166 – 169, 249 – 253).

We also provided a brief description of the JSSF scale (Line 166 – 169).

• Please provide a brief description of the different grading systems (Hardy and Clapham, Larsen, dislocation), as well as the JSSF in the methods.

Following the reviewer’s suggestion, we added a brief description of the grading system (Line 135 to 142)

• Which statistical package was used for analyses?
The information about statistical software was added in M&Ms (Line 175 to 176).

- Please include percentages of the sample for each case number in tables 2 and 3 (and indicate this in the titles).

The information about percentages of the sample for each case number in tables 2 and 3.

- In Table 4, are the first 3 variables pre-operative? Please indicate.

We added the information in table 4.

- In light of some of the comments above, I also suggest changing the title to something like: “Pre-operative radiographic and clinical factors associated with recurrent floating of the lesser toes after arthrodesis of the first metatarsophalangeal joint and resection arthroplasty for the lesser toes for rheumatoid forefoot deformity”

Thank you for your suggestion. We changed the title of our manuscript as” Pre-operative radiographic and clinical factors associated with postoperative floating of the lesser toes after arthrodesis of the first metatarsophalangeal joint and resection arthroplasty for the lesser toes for rheumatoid forefoot deformity”.