Author’s response to reviews

Title: The effects of different shapes of capsulorrhexis on postoperative refractive outcomes and the effective position of the intraocular lens in cataract surgery

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Responses to the comments of Reviewer

Reviewer: Yong Wang, M.D. (Reviewer 1)

Reviewer's report:

Dear Prof. Yong Wang,

Thank you for your kind instructive comments and suggestions.

Comment 1: In the "methods Section", were the patients randomly grouped? What kind of random method was used?

Response: We feel really sorry that we did not provide a clear description of this point in our initial manuscript. Accordingly, we have revised this point at the beginning of the methods in
abstract. This is a nonrandomized clinical trial. All patients undergoing phacoemulsification received intraocular lens based on the principle of voluntary.

Comment 2: What was the spherical aberration of the two intraocular lenses? Did the author consider the spherical aberration of the cornea when implanting different intraocular lenses?

Response: Thank you for your insightful suggestions. The spherical aberration of the 509M IOL is -0.18µm, the spherical aberration of the Tecnis IOL is -0.27µm, corneal aberrations and total ocular aberrations were measured before and after surgery by itrace. We found that there was no significant difference in corneal sphericity between preoperative and postoperative (P > 0.05). And there was no significant difference in the total spherical aberration between the two groups (t = -1.062, P = 0.297), so we used these two types of IOLs as our research subjects, implanting different IOL according to the principle of voluntary choice of patients. And we have mentioned this part in the discussion.

Reviewer: Yun-E Zhao (Reviewer 2):

Reviewer's report:

Dear Prof. Yun-E Zhao:

Thank you for your kind instructive comments and suggestions.

Comment 1: The difference of ELP between the two groups should be mainly caused by different population and different IOL. The comparison maybe meaningless. I suggest the authors compare the two groups' difference value at different time points, which can reflect the evolution of ELP and the differences between the two groups.

Response: Thank you for raising this important question. We agreed that the ELP is meaningless between the two groups at the same time, so we delete this part in results section and the sixth paragraph of the discussion section. Furthermore, a new paragraph have been added in the discussion section, we analyzed the trends of the two groups at different time points by analyzing their materials, our conclusion is the hydrophobic acrylate has better axial stability.

Comment 2: The forms are too messy, the authors need to rewrite it.
Response: Thank you for your kind comments. The study includes too many influencing factors, so the forms look messy and complexity, and we have modified the forms to make it look clearer and easier for readers to understand.

Comment 3: Has the sample size been calculated to meet the needs of the study?

Response:

Thank you for raising this important question. In this analysis, we used the PASS software to calculate the sample size. This study is two-sample correlation coefficient, This study is consistent with the tests for two correlations, We enter $\alpha=0.05$, $\beta=0.10$, $p1=0.24$, $p2=0.78$ into the formula below:

$$\text{The result shows the two groups sample size } n_1 = n_2 = 38, \text{ we included 40 patients for study. Here are our results.}$$

We considered that due to the difficulty for the follow-up visits and the limited funding, we temporarily included these data for small sample analysis, and we have got the positive analysis results. In the future, we will increase the sample size to further verify the results.

Comment 4: In the present manuscript, postoperative refractive outcomes remain stable across three months in two groups, ELP remains stable in Tecnis group, whereas it became larger at 1 month in 509M group. Then, the authors analyzed Correlations of the morphological features of capsulorrhexis and the ELP and refraction deviation. But, theoretically, the deviation from predicted refraction should be correlated to ELP change, If any Capsulorrhexis Morphological Features parameter correlated to refraction deviation, it should affect refraction deviation by influencing ELP. So, the conclusion here is a little confused logically, please reanalyze and rewrite it.

Response: Thank you for your additional and meaningful suggestion. We are very sorry that we may not provide a clear and complete description of conclusion part in the initial manuscript. A new paragraph has been added to explain the results at the end of the paper:

The 509M IOL group showed an increase in ELP at 1 week and 1 month after surgery, We suspected that after the lens capsule lost its original support, the lens zonules were relaxed by the
support of the intraocular lens. Postoperative intraocular lens position moves backwards, which increases ELP, but this change in ELP has little effect on the change of postoperative diopter. We consider that as the ELP increase, the interaction among hydrophilic material IOL, ciliary muscle, lens zonules and capsules can change the postoperative diopter and maintain the stability of the diopter. In Tecnis IOL group, ELP is relatively stable, and there is no significant change in postoperative diopter, but if ELP changes, it affects postoperative diopter. We suspected that this hydrophobic acrylate IOL can increase adhesion to capsules. Compared to 509M IOLs, Tecnis IOLs may be more closely connected to capsule bag. Although the intraocular lens is relatively stable, once the intraocular force is given, the ELP will increase and affect postoperative diopter, the intraocular lens may not have enough flexibility to keep the diopter stable as the hydrophilic IOLs. Therefore, each type of intraocular lens has advantages and disadvantages, and various factors must be considered in the selection of IOLs.

Comment 5: In discussion, "Moving forward to the retina leads to a myopic deviation while moving backward to the retina leads to a hyperopic deviation. "moving forward to the retina, the retina should be cornea.

Response: Thank you for pointing out my mistake, I have corrected here in the article.

Comment 6: English and grammar are a problem and require upgrading.

Response: We are grateful for the kind comments regarding our paper. According to your kind suggestion, we have sought the assistance of a fluent English speaking colleague to polish our manuscript.