Reviewer's report

Title: Reproducibility of Corneal Graft Thickness measurements with COLGATE in patients who have undergone DSAEK (Descemet Stripping Automated Endothelial Keratoplasty)

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Reviewer: Jennifer Li

Reviewer's report:

This manuscript by Wong et al. evaluates the reproducibility of measurements of DSAEK graft thickness using both an automatic and a semi-automatic algorithm with a recently designed COLGATE software program. It is a novel software program that appears to allow for a more accurate measurement of donor corneal thickness after DSAEK surgery using anterior segment OCT imaging.

- Major Compulsory Revisions

1. Throughout the manuscript, the measurements that are being evaluated are referred to as the "DSAEK graft area". I understand that the authors are referring to the "area under the curve" of the cross-section of the DSAEK button, however, this phrasing is a bit confusing. It may be helpful early on the paper to include a schematic to visually demonstrate what is being measured (or at least to clarify this in the text). The confusion arises in that often when we refer to the area of the graft we think of the circumferential area. Graft thickness is most often thought of as a linear measurement, not as an area, and so it would be helpful to the readers to clarify this further.

2. The authors used 50 images from 23 patients. They state that multiple horizontal scans were performed but only the best quality used for measurements. How did they decide how many images to use from each patient? Were these arbitrary numbers of patients and scans? Can they further explain the characteristics of the images that were considered to be of high enough quality for inclusion in the study?

It would also be interesting (although perhaps outside of the realm of this study) to demonstrate how image quality changes the inter-observer and intra-observer reproducibility of the measurements. This would be somewhat akin to studies that were done by the Cornea Donor Study Group for the Specular Microscopy Ancillary Study.(1)

- Minor Essential Revisions

1. Overall, the manuscript is well-organized, however, I think there is too much material in the background section. Some of this can be moved into the discussion section. For instance, in the third paragraph of the background section: "However, there is much subjective variation in caliper placement by users, and inter-observer variations of measurements have been shown to have a SD of ...." I would consider putting everything between "have been shown to have an SD of...." and "..../semi-automated system would be more efficient, faster, and reduce the inherent error rate" into the discussion section. Similarly, I would consider putting the information in the last paragraph of the background section into the discussion section with the exception of the last two sentences.

2. The second to last paragraph of the background section is awkwardly worded. Please revise.

3. Define AS-OCT within the manuscript. It is used first in the methods section under "Scanning" but is not defined.

4. Figure 1. Where is figure 1 actually referenced within the text? Would recommend dividing the figure into "1A" and "1B" so that it can better clarified in the Legend what is being demonstrated in the two images. Particularly in the semi-automated image, is it possible to illustrate what the user is actually able to manually adjust when refining the edges of the graft?

5. When referencing "table 1" and "table 2" in the results section, please place these in parenthesis and not just at the end of the paragraph. Alternatively, consider incorporating into the body of the text (ie -- "Table 1 shows the....."

- Discretionary Revisions

1. I was unable to review the tables. They were not uploaded with the PDF of the article.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.