Reviewer’s report

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

Version: 1 Date: 5 December 2011

Reviewer: Perry S Binder

Reviewer’s report:

Major Compulsory Revisions

General comments
Some of the references are not from peer-reviewed journals and can be cited as personal communications or as footnotes.

Background
Reference number 1 is not the original reference for DSAEK. The authors may choose to leave it as is, but they should also cite one of the more original articles.
Reference 2 is old from 1993 and reference 3 is not citable. There are many contemporary OCT references that can be used.

I’m unaware of any sales data for the current OCT machines, but the Optovue is commonly used in the United States. It is not clear if the authors are referring to Fourier domain OCT that uses a moving mirror or previous time domain systems.

Please cite a reference documenting slow image acquisition. The word “reduced” resolution is used but were not told what the comparison is. They might consider citing the resolution of the various OCT systems or better yet, use a table to compare them. Can they cite a reference showing that the higher resolution instruments do not allow the image acquisition across the entire anterior chamber?

Since reference 4 belongs to the company and is not citable, the authors can use a better citable reference or place the Visante manual citation as a footnote.

The sentence that begins: “The interobserver and intraobserver results for the time domain machine were similar to that previously published;reference 5 is listed. What is the previous publication they referred to? The following data on the LOA and correlation coefficients are compared to what study?

The Colgate reference is not citable as is because it is a presentation. The authors may consider it as an unpublished observation or as a footnote. At the end of the paragraph references 5 and 14 are listed, but 7 through 13 are not listed until they are cited further in the text.

The last paragraph the Background belongs in the Discussion.
The 1st section of the Methods might be better as Image Acquisition instead of Scanning.

“Dark” conditions are mentioned but are not defined.

The operator adjusted the system... I assume they mean the system software, but they could also mean the orientation of the hardware. They should state that all images were obtained by the same operator for all 50 eyes.

Most of the image processing paragraph is either not referenced or not explained. It would probably be better to describe the Colgate program at this point. The reader does not know what the Canny Edge software is or does. We do not know how the authors determined the output to be sampled steps in 10 pixels. I assume this is from unpublished observations. Similar comments can be made about the subsequent paragraph descriptions of selecting the boundaries.

Did the 2 individuals who acquired the scans have any previous experience with the Colgate system or was this the 1st time they ever used it? The answer will help the reader understand the simplicity of the system if they used it for the first time.

The 1st sentence of the Results appears to be a repeat of the 1st sentence of Intraobserver Repeatability.

In the comparison between automated and semi-automated, 4 sets of readings were taken. Were these readings on all 50 eyes? All of the results can be easily displayed in a table or 2 tables to help decrease the length of the manuscript.

The limitations of analysis that the semi-automated method measured 2 times that of the manual method is not placed in the Results section, and is placed in the discussion for the 1st time.

The authors refer to the semi-automated program as being similar to the Heidelberg Retina Tomograph. It also appears to be very similar to the software used by the Artemis high-frequency ultrasound system.

The authors should also mention that the Optovue system also utilizes similar caliber software in a similar manner with similar potential errors of measurement.

It is not clear to this reviewer how knowledge of the postoperative graft would allow the surgeon to better visually rehabilitate a case. For example, if the measurement shows a graph thicker than X um, do they recommend graft exchange irrespective of the visual acuity at that point in time? And if a graft measures on the thin side, but the vision is poor what would they recommend? Since it is well known that graft thickness and cell density do not correlate, this generalization needs to be more clearly thought out.

Do the authors think the software can also be used to measure anterior lamellar grafts or Lasik flaps?
The conclusion suggests that the software could be used to determine the ideal diameter of a donor lenticule, but we are not told how this can be accomplished with what has been presented in this manuscript. Perhaps the authors clarify this statement.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this paper, either now or in the future?

I was a consultant for Optovue in 2007

Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this paper, either now or in the future?

No

Do you hold or are you currently applying for any patents relating to the content of the manuscript?

No

Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

No