Author’s response to reviews

Title: Comparing Habitual and i.Scription Refractions

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Author’s response to reviews:

Reviewer 1:

1. Introduction.

Write out VSMTF in full before abbreviating.

We have added this, thank you.

Pg 5. Lines 54-57. "The only instrument of its type currently on the market, the i.Profilerplus consists of an autorefractor and an aberrometer." This may not be wholly accurate as there is currently a PSF Refractor (Vmax Vision, Orlando, Fla.) allow clinicians accuracy to 100ths of a diopter.

Thank you, we have added a discussion of the PSF Refractor.

We found a number of references for the Vmax Vision PSF Refractor and other instruments including the two below. Most were not in peer-reviewed scientific journals and we cited the first by Medina Jr. in the manuscript.

The methods are one of the most important aspects of any research. This has not been well done.

How were the subjects recruited?

Thank you for this feedback. Subjects were recruited via a campus wide e-mail to all students, faculty and staff. Clinic patients at the Midwestern University Eye Institute were also invited to join the study if they met the inclusion criteria. This has been explained in the manuscript.

Clearly state the inclusion/exclusion criteria.

Subjects were of either sex and of any ethnic group. Inclusion criteria included being between the ages of 18-39 years and being capable of seeing 20/20 in both eyes separately with, or without glasses correction. Subjects were excluded if they did not meet the inclusion criteria, if they had been diagnosed with any eye diseases or conditions like cataracts or keratoconus, and if they had previous refractive surgery such as LASIK or PRK. This is now included in the manuscript.
"A subjective refraction using the standard equipment, the standard procedure, the standard eye chart (black letters on a white background), and standard room lighting used in a typical eye exam was performed on all subjects."

Please clarify type and make of equipment used.

Thank you, this has been added to the methods section of the paper.

It has been suggested that the inscription could be beneficial to patients with night vision problems from high order aberrations. Were other causes of poor night vision in these subjects explored. E.g. retinitis pigmentosa?

A broad assessment of ocular health was performed during the study. Part of the exclusion criteria was previous diagnosis of ocular conditions and our subjects were up to date on their eye exams. We do not anticipate any subject have any other ocular problem that could lead to poor night vision.

Pg8. Line 19. How was the best measurement determined?

Revised to read as follows:

When multiple measurements were taken from iProfilerplus, the first image was selected when all images were of similar quality with similar pupil sizes. If images were not similar in quality, only the best measurement was chosen such that the ring and sensor images showed minimal discontinuities (often due to tear film breakup or interference of the eyelids).

For your reference, below you will see screen shots to illustrate this process and some of the things we looked for. In sample eye 1, both sets of sensor images had a 4.8mm pupil for the ring images and were of good (and equal) quality. The ring images were also of comparable quality with similar pupil apertures at 4.5mm and 4.8mm. In this case, the first images were chosen for analysis.

Sample Eye 1 Image Set 1:

Sample Eye 1 Image Set 2:
Sample eye 2 illustrates images with poorer quality. Here the sensor images had pupil apertures of 3.9mm and 2.9mm and both had sections with discontinuities (one in the middle for the first case and a few at the top for the second). The ring images were 4.5mm and 4.8mm pupil with minimal discontinuities. In this case, the first images were chosen for analysis.

Sample Eye 2 Image Set 1:

Sample Eye 2 Image Set 2:

3. Analysis.

How was data recorded?

How was data analysed. What data analysis software was used? What statistical tests were conducted? At what level were tests of statistical significance set?

Results.

All the data were manually captured on a recording sheet. This data was then entered into excel for some of the data analysis. SPSS (IBM) and BoxPlotR (online version) was used to calculate boxplots [17]. First, normality of the data was assessed using Shapiro Wilk test. Habitual, subjective and i.scription refraction were compared using t-tests. Correlation between optical aberrations and refraction was performed. Scores from the questionnaire for the symptomatic vs asymptomatic subjects were compared statistically. Statistical significance were set with a p-value of 0.05. This section is included in the manuscript.

Pg 9. Lines 4-10. This should appear in the methods section.

You cannot mention correlation in the results without referring to it in the statistical analysis section of your methods.

Correlation analysis is now included in the methods sections as a choice of statistical test. The outcome of the correlation test is mentioned in the Results section, hence that section was not moved.
4. Results.

How many had night vision problems? This is mentioned in the abstract but not in the body of the manuscript.

This is now included in the Results section of the manuscript.

There are so many limitations to this study. None was mentioned.

Yes, we agree. Our discussion section now includes these limitations. This is copied below for your reference.

Limitations:

There are few limitations in the current study. While this study demonstrated no statistical difference in prescription between the i.Scription and the manifest refraction, future studies are warranted to determine if there would be a perceived improvement in vision when comparing spectacles made in a particular lens design with the i.Scription vs. free form digital lenses ground in the same lens design using the manifest refraction. In addition, there was a smaller sample size. Larger sample studies should be performed to understand this better.

5. Conclusions.

You cannot draw these conclusions without clarifying the methodology and mentioning the study limitations.

Methodology and study limitations have now been updated. We feel that our conclusions observed based on statistical analysis holds well.

6. Declaration.

It appears this work was presented at the American Academy of Optometry in 2017. It should be stated.

This has been updated in the manuscript.

Reviewer 2:
1- Introduction is very long, it is better to be brief.

We have trimmed the Introduction section based on your recommendation.

2- Please explain the definitions of Habitual refraction, subjective, manifest, and i-scription.

Modified the text to the introduction:

Thus, the aim of this study was to investigate the difference in the refractions generated by i.Scription computed from a manifest subjective refraction (results of a subjective refraction) and the habitual refraction (self-reported by the subjects). The i.Profilerplus aberration values, pupil size measurements and the patients self-rated night vision complaints were also considered in relation to this refractive data.

3- More details about habitual refraction were needed "the standard equipment, the standard procedure, and the standard eye chart". Line 29, page 7.

A subjective refraction was performed using a standard testing lane with mirror projection. The end point of refraction was minimum minus for maximum visual acuity followed by binocular balancing. Visual acuity was tested using a logMAR chart from M&S Smart System Standard. This information is updated in the manuscript.

4- Line 19, page 8, "only the best measurement was chosen". What did you mean by the best measurement?

Revised to read as follows in the manuscript:

When multiple measurements were taken from iProfilerplus, the largest pupil size was selected when all images were of similar quality. If measurements were not similar in quality, only the best measurement was chosen such that there were minimal missing spots (often due to tear film breakup).

5- Please refer to table 1 in your results.

Table 1 is now referenced in the manuscript.

6- Discussion did not discuss all the items of the results, with some lack of other related researches.
Discussion section now includes certain other findings from the results that were accidentally not mentioned.

7- Your conclusions in the manuscript were deficient and differed from that of the abstract. Conclusion section is now updated to match the abstract.