



Quantification of Midday Fogging in Scleral Lens Patients.

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PURPOSE

Midday fogging (MDF) is a common occurrence for scleral contact lens wearers, with approximately 25% of wearers experiencing blur or interrupted lens wear as a result. Grading of MDF can prove to be difficult due to the non-uniformity of the accumulation under the lenses. While mid-day fogging is not well understood, determining an objective method to quantify MDF is necessary when attempting to compare variables which may be contributing to the phenomena.

METHODS

Scleral lens wearers with a history of MDF were enrolled. Anterior Optical coherence tomography (OCT) images were captured for each subject which included the ocular surface, the scleral contact lens, and the tear reservoir between these two surfaces. OCT images were captured using a Visante OCT (Carl Zeiss, Germany) and Cirrus OCT (Carl Zeiss, Germany). Images were saved as digital files in black and white. A masking method was created for the OCT images such that graders were not aware of the identity of the patient. Digital images were distributed to examiners for masked grading. Examples of fogging with increasing density of particulate were given for reference with fogging to be graded on a 0-5 scale. Images which received differing grades were adjudicated by having both graders view the projected images simultaneously. Discussion between the graders then resulted in a consensus grade.

Quantification of Midday Fogging (MDF) makes it possible to conduct future research needed to find methods of decreasing MDF in scleral lens wear.

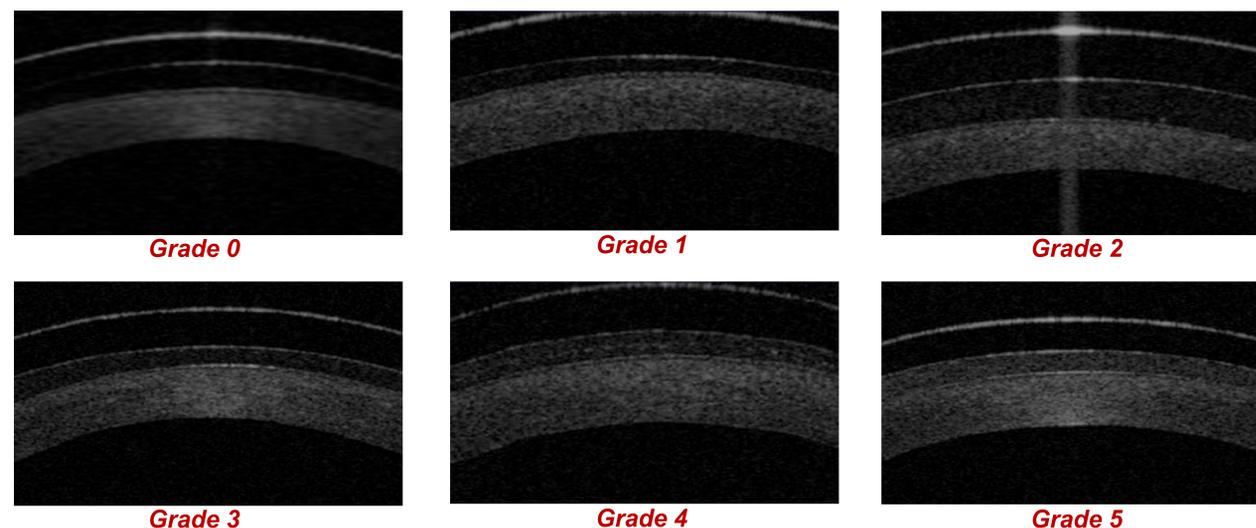


Figure 1. Examples of graded Optical coherence tomography (OCT) images collected with a Visante OCT and graded by masked examiners.

RESULTS

Initial assessment of the images showed agreement between two graders (41.18% $p < 0.0000$) for the Visante and (30.88% $p = 0.0125$) for the Cirrus using Fleiss' Kappa statistics. Adjudication of grades for the images which did not show agreement initially found that interpretation of unevenly distributed particulate required further grading refinement. If one or more large coalesced groups of particulate was present, the grade was increased by one digit. Following these rules, a consensus was reached for the remaining OCT images. The average final MDF grade for images captured with the Visante (2.4 ± 1.6) were graded higher than those of the Cirrus (1.9 ± 1.6). This was likely due to the wider Visante view, allowing for more opportunity to view large coalesced particulate. This study demonstrates anterior OCT may be a useful tool to quantify MDF, although MDF measured with one anterior OCT may not be comparable to that of a different OCT model.

CONCLUSION

Following a masked system of anterior OCT image grading that includes density and size of particulate allows clinicians and researchers to quantify fogging under a scleral lens. Quantification of MDF makes it possible to conduct future research needed to find methods of decreasing MDF in scleral lens wear.

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