

Higher Order Aberrations in Air Optix Colors vs. Air Optix Aqua Soft Contact Lenses

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Synopsis

The aim of this study is to compare higher order aberrations (HOAs) through Air Optix Colors (AOC) and Air Optix Aqua (AOA) using the Shack-Hartmann aberrometer. It is unknown what effect the color has on these contact lenses, but it is important to find out because they are the most breathable colored contacts on the market.

Lens Parameters	Air Optix Colors	Air Optix Aqua
Diameter	14.2mm	14.2mm
Base Curve	8.6mm	8.6mm
Center Thickness	0.08mm @ -3.00D	0.08mm @ -3.00D
Available Powers	+6.00D to -6.00D (0.25D steps; incl. plano) -6.50D to -8.00D (0.50D steps)	+6.00D to -6.00D (0.25D steps) -6.50D to -8.00D (0.50D steps)
Lens Properties	Air Optix Colors	Air Optix Aqua
Dk/t	138 @ -3.00D	138 @ -3.00D
Material	lotrafilcon B	lotrafilcon B
Water Content	33%	33%
Specific Gravity	Unknown	1.08
Refractive Index (hydrated)	1.42	1.42
Light Transmittance	>95%	96%

Properties of Air Optix Colors vs. Air Optix Aqua

Introduction

Air Optix Colors contact lenses are the first colored lenses in the market with a Dk/t comparable to leading silicone hydrogel lenses. This property makes them desirable to eye care practitioners (ECPs) who have patients seeking to change their eye color. The past colored lenses on the market have been shown to decrease optical quality and cause hypoxic complications due to low Dk/t values.

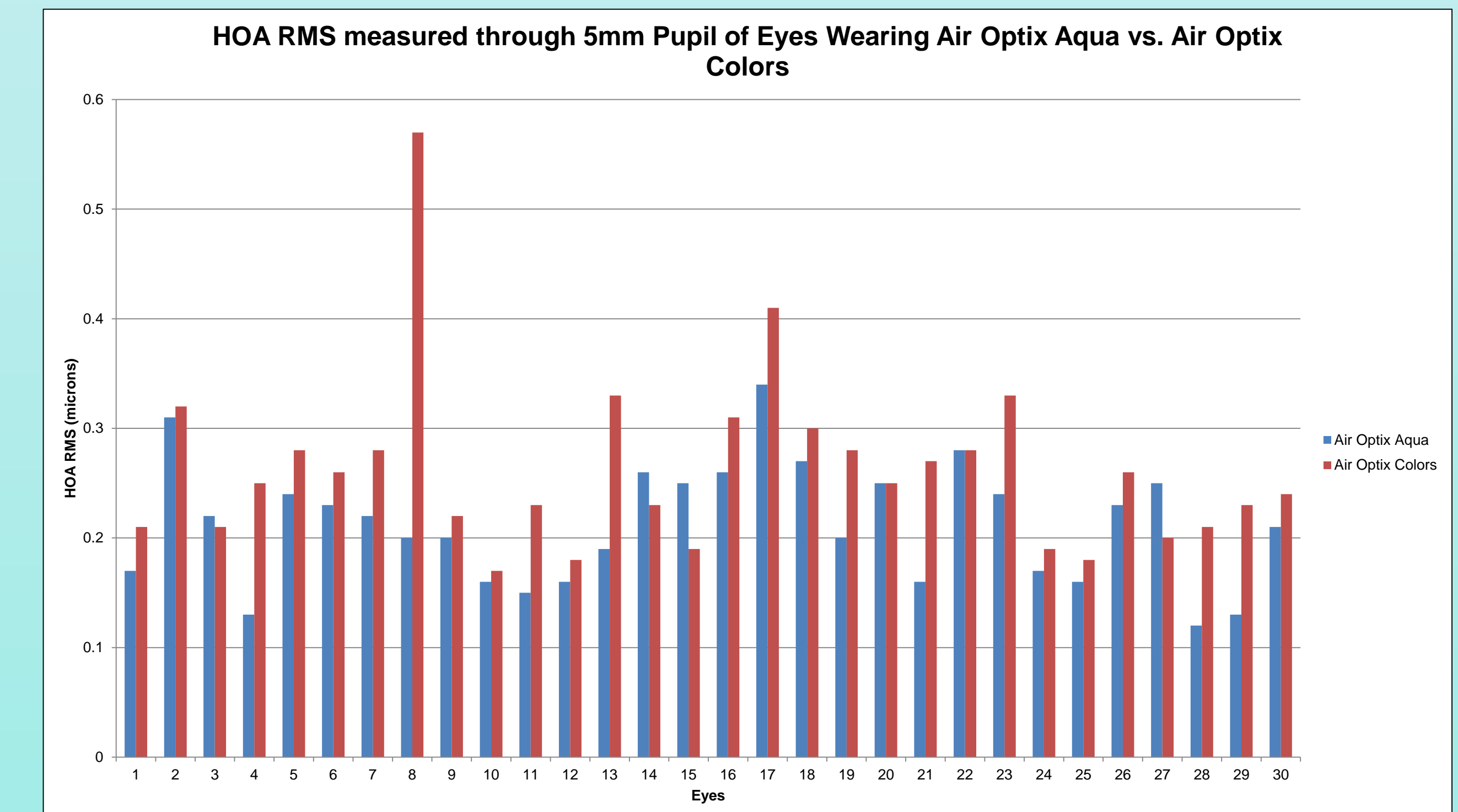
With the latter issue resolved, it is important to determine if AOC increase higher order aberrations (HOAs) compared to their clear counterpart, AOA.

Methods

Shack-Hartmann wavefront sensing technology with the Zeiss i.Profiler[®]plus was used to measure HOAs present in 30 eyes while wearing Air Optix Aqua contact lenses and comparing that to eyes wearing Air Optix Colors in green. These measurements took place with a natural pupil and a 3mm and 5mm analyzing standard was used when gathering data. Total HOA Root Mean Squares (RMS) values were used to compare statistical significance between the two lenses.

Results

Air Optix Colors lenses induced a higher statistically significant amount of HOAs when compared to Air Optix Aqua in both a 3mm and 5mm pupil. The 3mm pupil size nearly doubled HOA RMS, as they increased from 0.0620 with AOA, to .1063 with AOC ($p < .0001$). In the 5mm pupil, HOA RMS went from .2120 with AOA and increased to 0.2623 with AOC ($p = .0013$).



Discussion

This study was limited to the objective measurement of the total HOA RMS, which was the calculated mean of the individual third through seventh order Zernike coefficients. It may be beneficial to analyze the individual Zernike coefficients induced by these lenses, to find out which HOAs were more prevalent in the colored contact lenses versus the clear. Subjective measurements are required to determine the way in which wearers are affected by the contact lenses. Contrast sensitivity testing, visual field measurements, and scotopic visual function have been studied in other colored lenses to further determine the quality of vision that may be experienced when wearing AOC.

References

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