

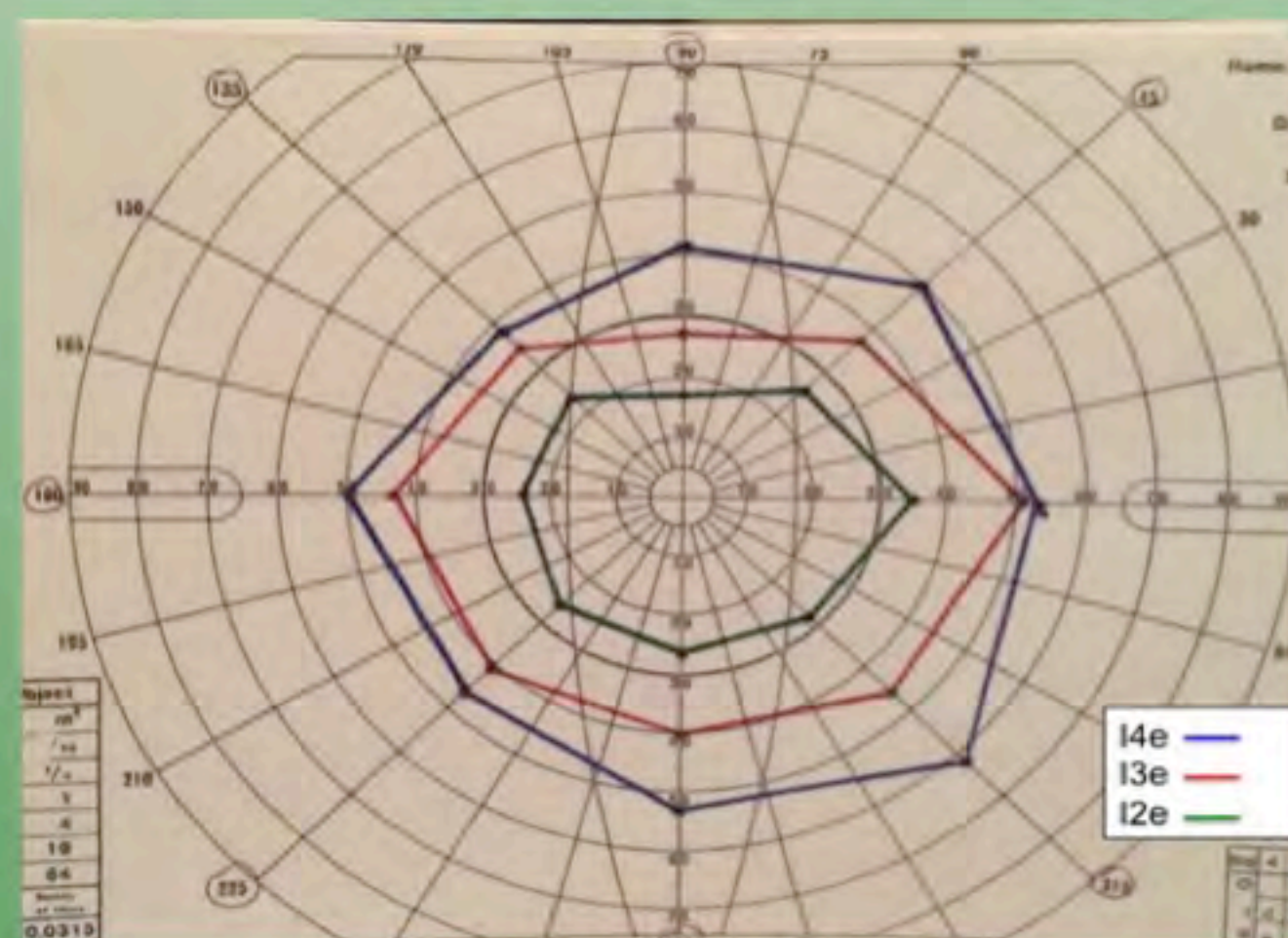
## Abstract

**Purpose.** To investigate how Air Optix Colors affects a patient's field of vision.

**Methods.** 22 subjects were fit with a brown Air Optix Colors lens on the right eye. Three isopters were measured with Goldmann bowl perimetry with and without the lens.

**Results.** A statistically significant decrease of all three isopters on Goldmann perimetry was found.

**Conclusion.** Air Optix Colors contact lenses have the ability to limit the field of view of the wearer.



**Figure 1.** Example recording form showing three different dots for each illumination (outer-I4e, middle-I3e, inner-I2e) and the degree lines tested.

## Introduction

With the rising incidence of colored contact lens wear, several concerns have surfaced regarding their impact on visual performance. Air Optix Colors was released in 2014 using the same design and material as Air Optix Aqua clear contact lenses. The lenses are available in nine different colors and are made of lotrafilcon B. Statistically significant visual field constriction has been found in multiple studies with previously manufactured soft colored contact lenses. Considering the recent increase in colored soft contact lens wear for both cosmesis and refractive error, this study will attempt to address the effect Air Optix Colors have on visual fields through Goldmann perimetry.

## Methods

22 uncorrected subjects were fit in Air Optix Colors in brown on the right eye. Inclusion criteria included a refractive error of +1.00 to -4.00D sphere and -0.75D astigmatism or less, BVA of 20/20, and 35 years of age or younger. The lens settled for 15 minutes. Three isopters (I4e, I3e, I2e) were measure on each subject, with and without the lens, using Goldmann bowl perimetry. Over-head lighting was turned off and the standard background illuminance of 31.5 lux was used. Order of visual field testing with or without the lens was randomized. Eight visual degrees were tested (0, 45, 90, 135, 180, 225, 270, 315) (Fig 1). Each polar coordinate corresponding to the eight different degree lines tested was converted to an x-y coordinate using trigonometric functions. The eight degree lines created nine separate triangles, each 45 degrees apart. The area of each triangle formed was calculated using the basic triangular area formula in centimeters squared. All nine areas were summed to encompass the entire 360 degree visual field for each isopter. These results were averaged, and the percent change was determined.



**Figure 2.** Boxplot showing the distribution of raw data. The total area of each isopter was decreased with the brown Air Optix Colors lens on the eye.

## Results

A Paired T-Test and Wilcoxon Signed Rank Test were used for statistical analysis (Table 1). P values for the I4e, I3e and I2e isopters were all 0.00 and found to be significant at all confidence intervals for both the T-Test and Wilcoxon. There was approximately a 65% decrease in area found with the I2e isopter while wearing the lenses, a 36% decrease in area with the I3e isopter and a 21% decrease in area found with the I4e isopter.. Only one subject showed an increase in the I4e isopter alone with the lens compared to without. A box plot was constructed to represent the spread of the raw data obtained in centimeters squared. Results were very symmetric and unskewed overall.

Isopter	Avg w/ lens	Avg w/o lens	P value (Wilcoxon)	P value (T Test)	T value
I4e	155.2	197.2	0.000	0.000	8.663
I3e	80.4	126.2	0.000	0.000	12.342
I2e	21.3	60.5	0.000	0.000	13.344

**Table 1.** Total averaged area (cm<sup>2</sup>) for each isopter and the statistical significance comparing each with and without a lens.

## Discussion

This study showed that the use colored contact lenses, as a device in dimly lit conditions, could be a potential hazard to the wearer. Patient's should be educated on the possible visual field restriction colored contact lenses may cause. Additionally, current wearers of Air Optix Aqua contact lenses should be encouraged to "experience" the visual impact an Air Optix Colors lens may have prior to ordering a supply. Air Optix Colors diagnostic lenses were supplied by Alcon make this study possible.

## References

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George DM, Hendricks C, Insler MS. Visual field constriction caused by colored contact lenses. *Arch Ophthalmol*, Dec 1988;106:1680-2.

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