# Myopia Management with Orthokeratology in Patients with Low Myopia

David Kading OD, FAAO, FCLSA; Courtney Melchione, OD
Specialty Dry Eye and Contact Lens Research Center, Seattle Washington

## Introduction

Orthokeratology is a leading treatment to slow the progression of myopia. Orthokeratology correction provides acceptable central distance vision while creating peripheral defocus that slows the retinal stimulus for continued axial growth. There is question as to how much peripheral defocus is necessary to provide adequate myopia management, but it is generally accepted that as much peripheral defocus as possible is desirable. It has been believed that patients with low myopia receive less treatment from orthokeratology than a patient with a high refractive error, as the sole source of peripheral defocus comes from the uncorrected peripheral cornea outside of the treatment zone. With this theory a -1.00 diopter refractive error would have 1.00 diopter of peripheral defocus, while a -4.00 diopter refractive error would have 4.00 diopters of defocus. A potential source of additional defocus is dioptric changes in the peripheral cornea following the redistribution of the cornea post treatment. This study analyzes topographical changes in patients with low myopia being treated with orthokeratology to determine the maximum dioptric amount of peripheral defocus treatment they are receiving.

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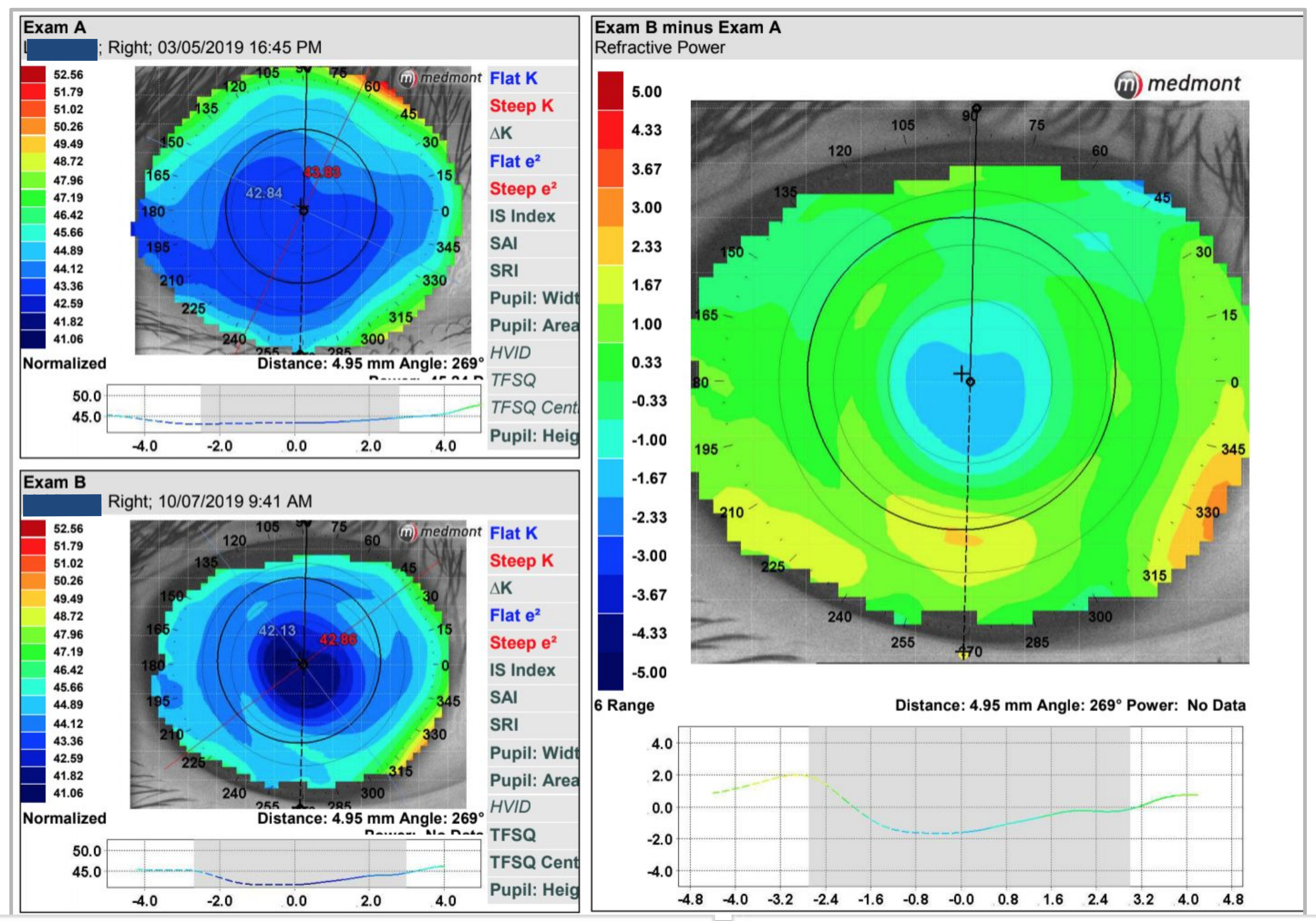
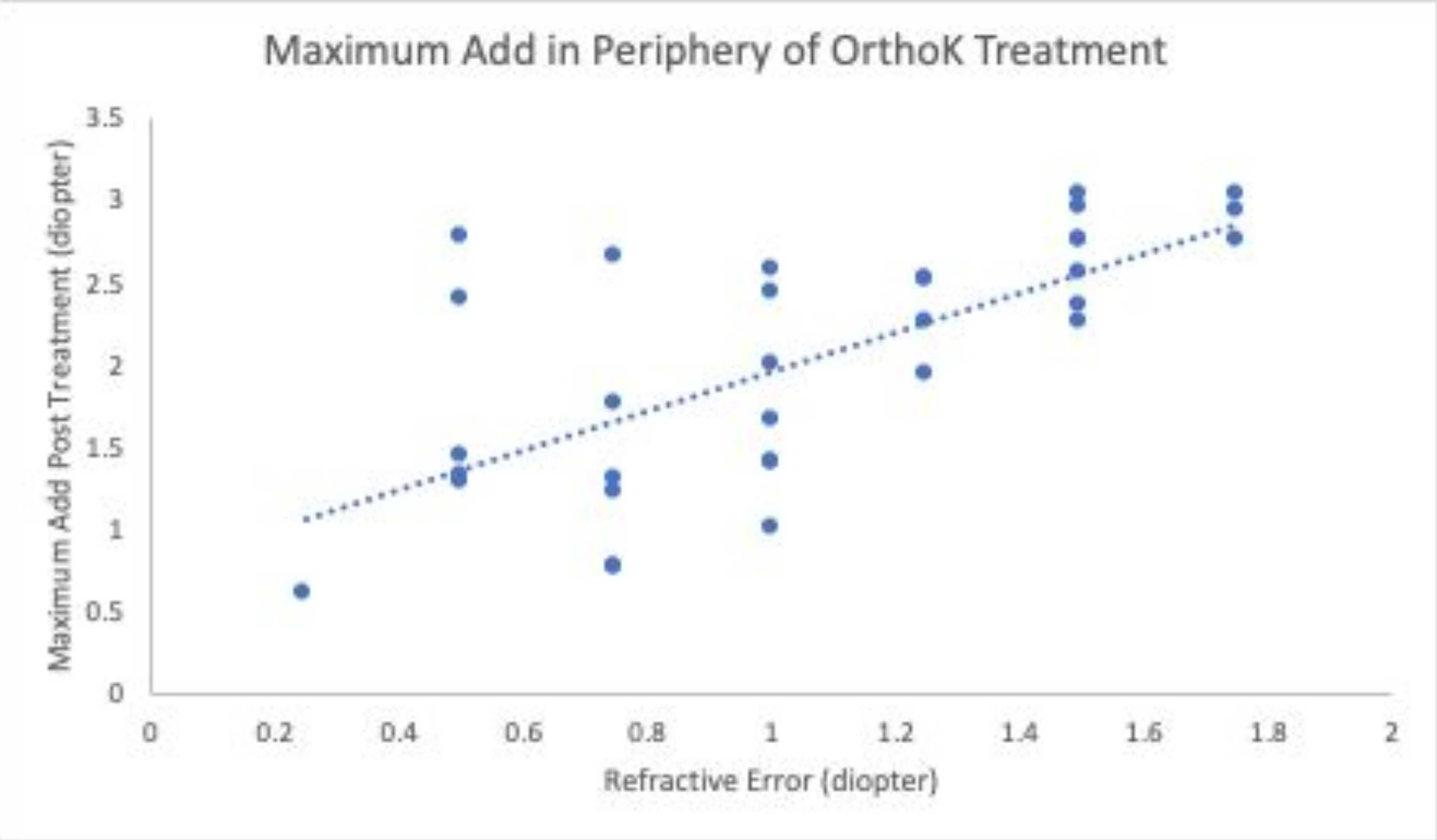
## Methods & Materials

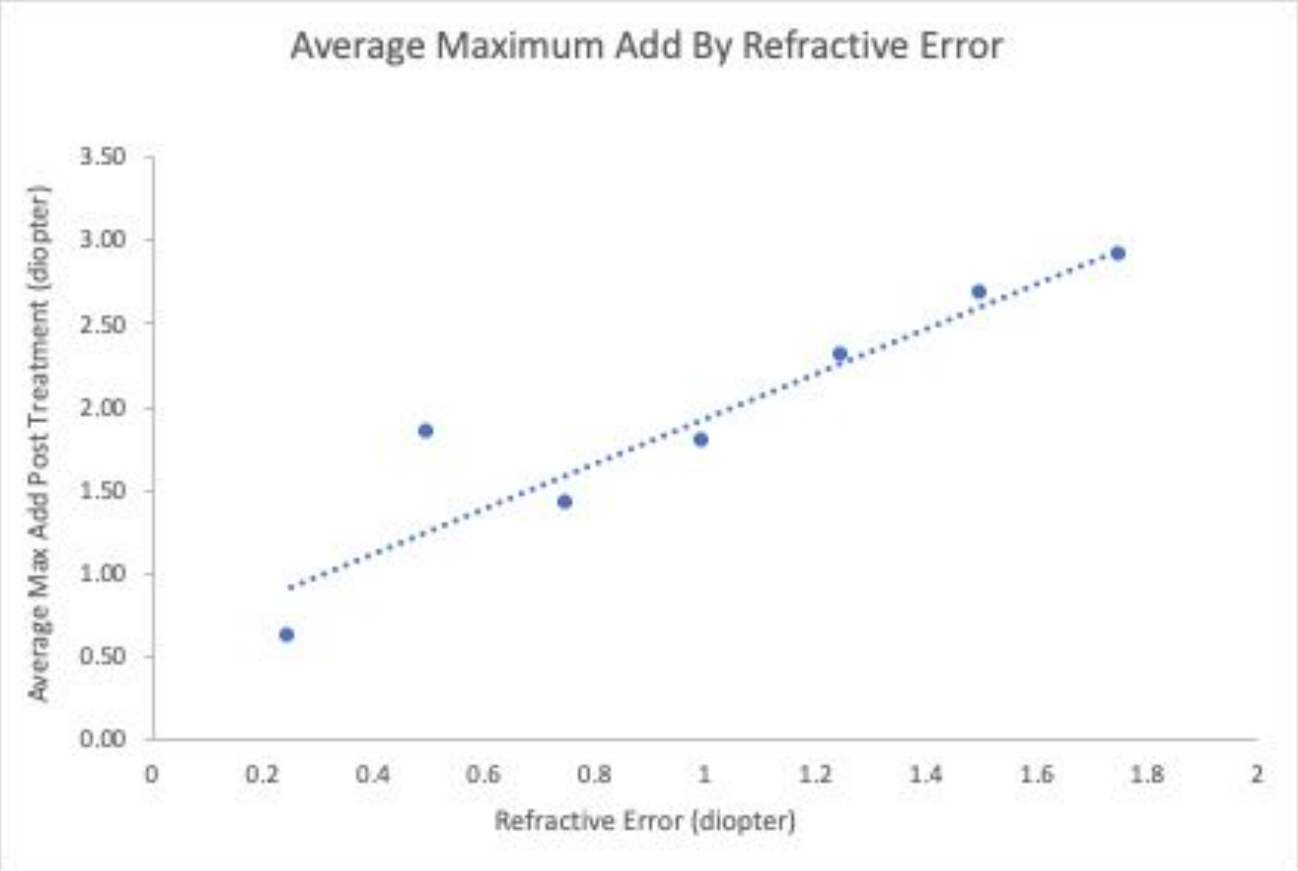
All active patient records enrolled in a myopia management practice utilizing orthokeratology were analyzed. 33 eyes of 17 subjects were included in the analysis. Subjects with a refraction less than -2.00 diopters before lens fitting were included in the study. Baseline topography was compared to the final fit topography for each eye. The refractive power difference map was analyzed to determine the greatest amount of positive dioptric change induced within the pupil margin from the redistribution of the corneal shape. This additional plus power was added to the initial refraction as the maximum peripheral defocus the subject was receiving.




## Results

While the trend demonstrates an increasing peripheral defocus as the initial refractive error increases, low myopic prescriptions have a wide range of total maximum defocus. A subject with an initial refractive error as low as -0.50 diopters has an add of 2.76 diopters. The range of peripheral defocus magnitude is wide in refractive errors from -0.25 to -1.00, with some receiving low adds and some high adds. The range among subjects begins to decrease and the average maximum peripheral defocus increases with increasing refractive errors.




## Conclusion

The data set of 33 eyes with refractive errors ranging from -0.25 to -1.75 diopters demonstrates that an increased maximum add power, comparable to a soft multifocal contact lens, can be obtained in low myopic refractive errors with orthokeratology. The trend shows that with increasing initial refractive error the total maximum defocus is more consistently high. Each low myopia orthokeratology fit should be evaluated in practice to determine the amount of maximum peripheral plus achieved in the fit. If the progression of myopia is not slowed due to low peripheral defocus, other treatment methods should be considered; however, this data suggests that many low myopia patients could achieve reasonable peripheral defocus with orthokeratology.

### Limitations

A limitation of this study is the lack of circumferential uniformity in the additional peripheral defocus. While the study demonstrates that additional defocus is contributed by topographical changes following treatment with orthokeratology, it is unknown how uniformly the defocus needs to be distributed to be of benefit.

### Acknowledgements

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### Contact Information

For more information, please contact Dr. Kading at drdave@specialtyeye.com.