

Increasing the Use of Toric Orthokeratology Lenses in a Specialty Lens Practice

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Purpose

Myopia Management continues to gain in popularity across the World. As a private practice doing Myopia Management, fitting trends tend to shift in an effort to improve vision and the myopia management effects. Over the last 10 years more orthokeratology manufacturers have begun to offer enhanced fitting designs, including toric orthokeratology. The purpose of this study was to evaluate the fitting trends of spherical and toric orthokeratology lenses over the last ten years within the practice

Introduction

Orthokeratology for overnight wear has been utilized since FDA approval in 2002 but has been increasing in popularity due to the myopia pandemic.

Our practice has been doing myopia management and orthokeratology since its opening in 2007. At first, we utilized standard orthokeratology designs manufactured by several companies. These designs were spherical in all their zones. When a lens decentered, our strategies to enhance fit were limited, which resulted in many patients having compromised vision.

Around 10 years ago many of the major orthokeratology manufacturers began mass manufacturing toric curves to account for elevation differences that patients encountered across their meridians. We began utilizing these lenses with increased frequency, but these lens designs still seem to be a minority in the majority of practices, including ours.

We wanted to see if there was an upward trend of toric orthokeratology designs in our practice and, if so, why are we using them more often?



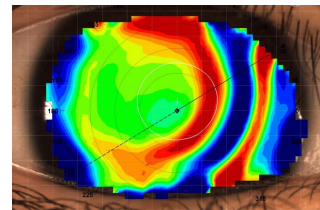
Methods & Materials

A retrospective review was done of the orthokeratology empirical lens orders over the last ten years (July 2012 to June 2022) in a single private practice setting. The lenses were evaluated and divided into spherical and toric categories.

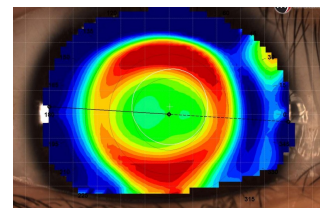
The percentage of toric lenses ordered compared to the total number of lenses ordered was broken down into six-month periods (July to December and January to June) and then evaluated in yearly segments from 2012 to 2022.

Results

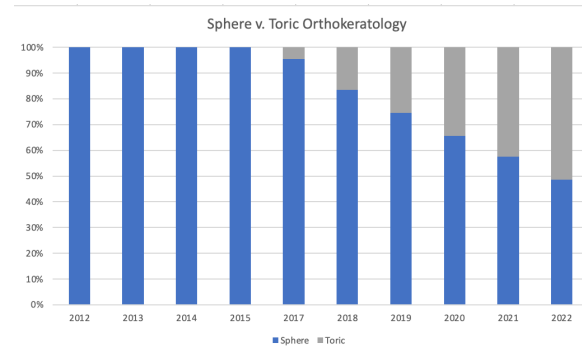
From July 2012 to June 2017, 0% of lenses ordered were toric orthokeratology lenses; meaning that 100% of lenses ordered during this time period were spherical orthokeratology lenses. The practice started utilizing toric designs in July 2017, with 9% of the lenses being toric from July 2017 to December 2017. In subsequent years, there was an increase in toric lenses being ordered with 16% in 2018, 25.5% in 2019, 34.5% in 2020, 42.4% in 2021, and 52% in 2022 thus far (January 2022 to June 2022).



Patient Fit with Spherical Lens



Same Patient Fit with Toric Lens



Conclusion

It is not likely that our practice has had an increase in patients with astigmatism, but rather we have realized the benefit of using toric orthokeratology designs in more patients.

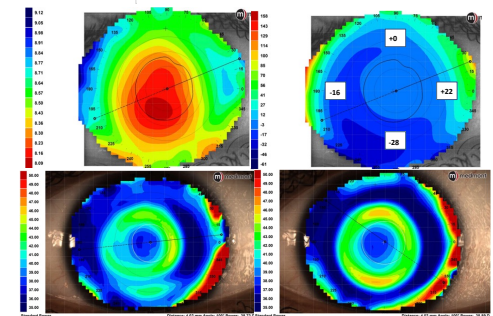
For initial fitting, it is vital to look at the baseline topography's elevation map in order to determine whether a toric lens is needed. If there is a difference of 30 microns or more between the principal meridians using an 8mm cord, then a toric design is warranted.² Even if the patient has apical astigmatism, rather than limbus-to-limbus, they may still have a difference of 30 microns or more in their peripheral elevation.

We even fit patients with none or minimal corneal astigmatism with toric designs when they have a large enough difference in peripheral elevation. It improves lens centration and treatment application, in our experience.

If you have patients with decentering lenses that are causing decreased visual acuity, then consider switching them to a toric design. Even a minimal toric design can cause a decentering lens to center better.

Limitations

Information on lens ordering was taken from only one orthokeratology manufacturer when two different lens manufacturers are utilized in our office. The manufacturer represented in this study makes up majority of the orthokeratology lenses at our practice, so we believe it is an accurate representation of our lens design use.



The top left image shows corneal topography of a relatively spherical looking cornea. The top right image shows the elevation map of that cornea with values designated in the primary meridians at the 8mm cord. You can see that there is a 26-micron elevation difference in the vertical meridian and a 38-micron elevation difference in the horizontal meridian. The bottom left image shows the topography of the same cornea after wearing a spherical orthokeratology lens. You can appreciate poor seal and slight inferior temporal decentering of the lens. The bottom right image shows the same cornea after wearing a toric orthokeratology lens. The patient has an improved bullseye pattern but improved visual acuity with the toric lens.

References

1. Jiang, Jun, et al. "Comparison of Toric and Spherical Orthokeratology Lenses in Patients with Astigmatism." *Journal of Ophthalmology*, vol. 2019, Feb. 2019, pp. 1-9. DOI.org (Crossref), <https://doi.org/10.1155/2019/8775569>.
2. Tomiyama, Erin S., et al. "Corneal Elevation, Power, and Astigmatism to Assess Toric Orthokeratology Lenses in Moderate-to-High Astigmatism." *Eye & Contact Lens: Science & Clinical Practice*, vol. 47, no. 2, Feb. 2021, pp. 86-90. DOI.org (Crossref), <https://doi.org/10.1097/CL.0000000000000721>.

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