The "Magic Triad" for Orthokeratology and Myopia Management

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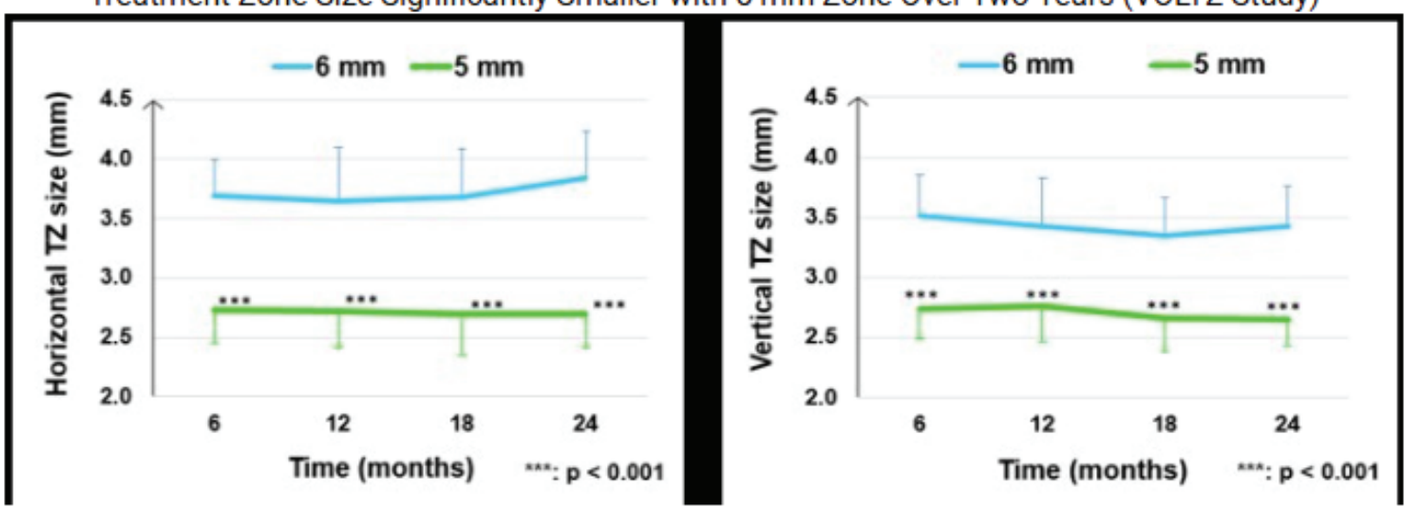
It has long been held that the fundamental goal of Orthokeratology (OrthoK) fitting is centration, centration, centration. Although this is still true, except when it isn't (there is some evidence that slightly decentered treatment zones provide better myopia control), MOONLENS®, a modern, highly customized lens, has upped the ante with the "Magic Triad" of smaller optic zones, aspheric back surfaces, and the use of patient eccentricity values.

Smaller treatment zones have been studied at length and provide evidence that bringing the defocus of the mid periphery (return zone) closer to, or within, the pupil margin will logically increase the plus power and aberration to the retina and therefore, maximize the signal for decreased eye growth. However, using decreased optic zones alone has proved to be limited in producing significantly smaller treatment zones. In other words, simply reducing the optic zone from 6.0 to 5.0 does not give a one-to-one result, and the actual treatment zone is decreased much less than one millimeter on average. In a study by Carracedo, the average decrease in the treatment zone between a 5.0 and a 6.0 optic zone was a mere 0.3 mm.[1] Conversely, in the Variation of Orthokeratology Lens Treatment Zone (VOLTZ) Study which utilized an aspheric back surface, the same optimized treatment zone as MOONLENS, the horizontal treatment zone decreased by 1.15 mm on average between a 6.0 and 5.0 optic zone.[2] (Fig. 1)

Figure 1
Treatment Zone Size Significantly Smaller with 5 mm Zone Over Two Years (VOLTZ Study)



Horizontal Treatment Zone at 24-months:
6.0 mm: 3.84 ± 0.39 mm 1.15 mm difference
5.0 mm: 2.69 ± 0.28 mm

Vertical Treatment Zone at 24 -months
6.0 mm: 3.42 ± 0.34 mm 0.72 mm difference
5.0 mm: 2.65 ± 0.22 mm

(Image provided courtesy of Randy Kojima & Patrick Caroline, Pacific University College of Optometry)

Nice! This discrepancy is likely due to the fact that when decreasing the optic zone without using an aspheric back surface, the depth of the return zone actually decreases. (Fig. 2)

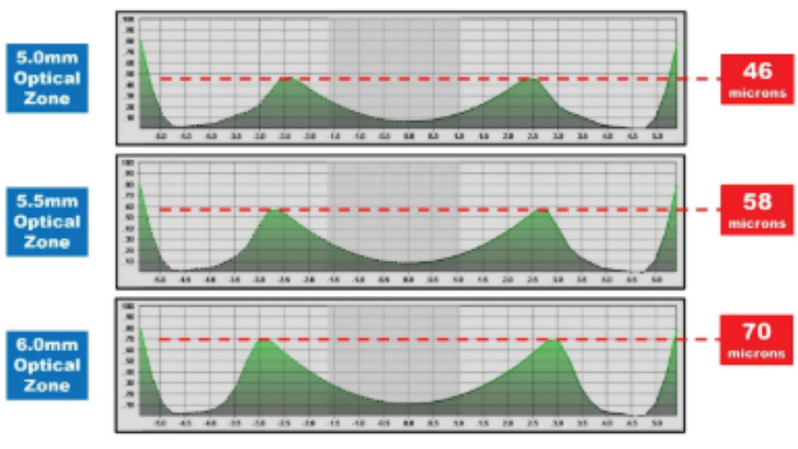


Figure 2
Tear Reservoir with Spherical Base Curve Decreases with Decrease in OZ
(Image provided courtesy of Randy Kojima & Patrick Caroline, Pacific University College of Optometry)

With a reduced optic zone in combination with an aspheric back surface, the depth of the return zone can be maintained. (Fig. 3)

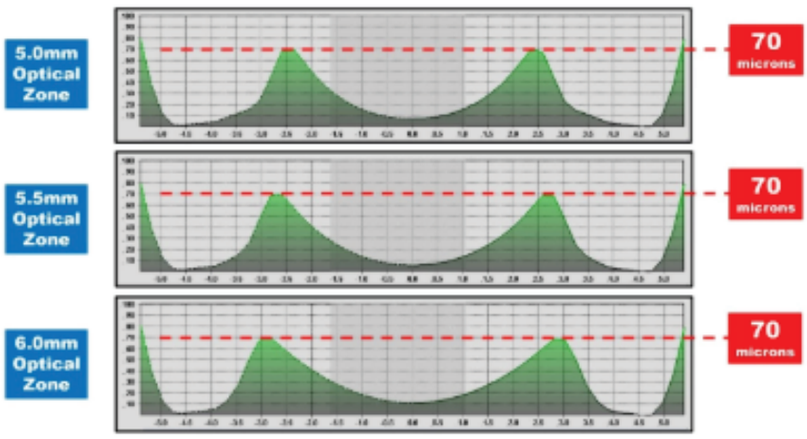


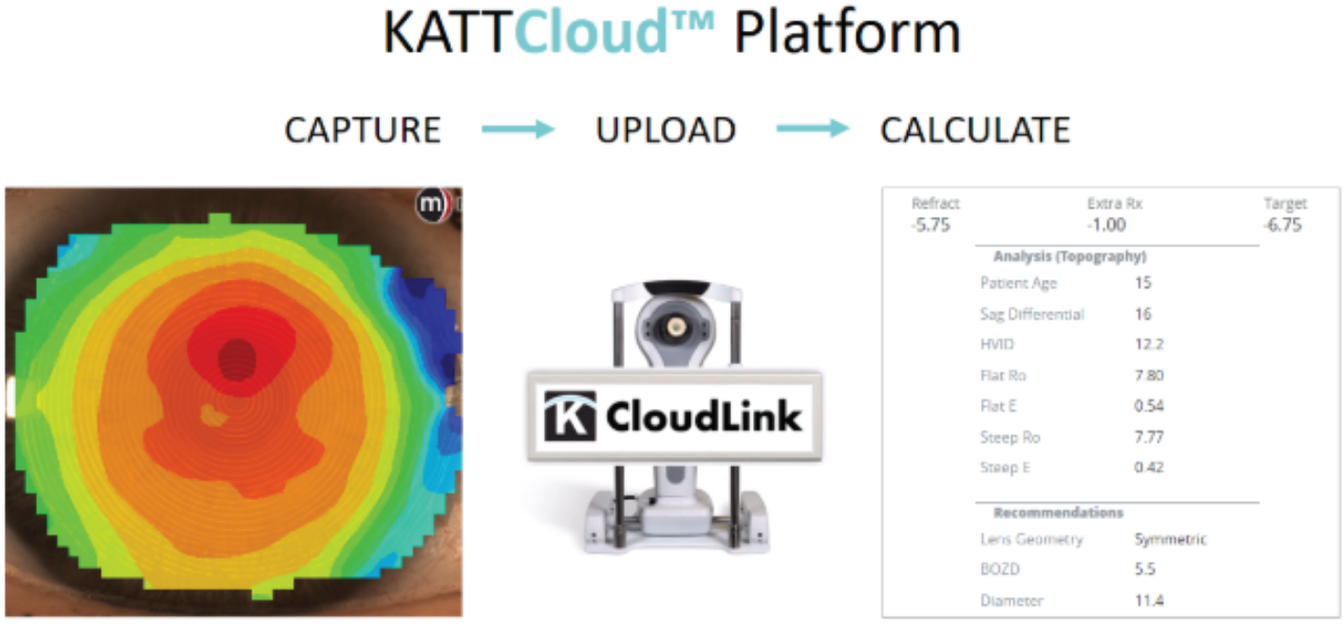
Figure 3
Tear Reservoir Maintained with Aspheric Base Curve and Decrease in OZ

(Image provided courtesy of Randy Kojima & Patrick Caroline, Pacific University College of Optometry)

Not surprisingly, the VOLTZ study also showed significant reduction in axial elongation of the eye over the 24-month period of the study using the 5.0 mm optic zone with the unique, optimized treatment zone versus the 6.0 mm optic zone. So far so good. Now, adding the third component of utilizing a patient's specific eccentricity in combination with other design elements, creates a custom tear shape and produces the maximum seal off in the periphery to provide the optimum signal for myopia control to the retina.

The MOONLENS utilizes this "Magic Triad" to design individual customized OrthoK lenses for each and every eye. What is the cost in time and effort to the practitioner to bring such customization to their patients? Nada! The KATTCloud software enables direct input of data from a practitioner's topographer and automatically incorporates the elements needed to design these highly customized lenses. (Fig 4)

Figure 4



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MOONLENS BY KATT DESIGN GROUP

In short, we are living in the world of highly customized OrthoK lens designs such as the MOONLENS, but with a simplified advanced technology platform that gives the practitioner all the tools and ease of fitting needed to incorporate myopia management with OrthoK into their normal flow of patient care. Full exam plus topography and the initial visit is done. Upload topography data to KATTCloud and the empirical fit and order of the lenses is done. With these tools and the "Magic Triad" sophistication, it is easy to see where the possibilities of managing myopia are headed...up and up!

1. The Topographical Effect of Optical Zone Diameter in Orthokeratology Contact Lenses in High Myopes. Carracedo Batres, Laura ; Martínez-Alberquilla, I. ; Espinosa-Vidal, T. M. ; , Gonzalo| Nowinska, Anna Journal of ophthalmology, 2019-01, Vol.2019 (2019), p.1-10 2. Variation of Orthokeratology Lens Treatment Zone (VOLTZ) Study: A 2-year randomised clinical trial Guo, Biyue ; Cheung, Sin Wan ; Kojima, Randy ; Cho, Pauline Ophthalmic & physiological optics, 2023-11, Vol.43 (6), p.1449-1461