



Hyperopic orthokeratology on myself

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Background

It is recognized that orthokeratology (OK) is an effective and safe treatment for low to moderate myopia. More recently attention has turned towards extending the OK modality to the correction of hyperopia and presbyopia. The use of steep-fitting rigid contact lenses specifically to induce a corneal steepening response with the aim of correcting hyperopia was first described by Jessen in 1962.¹ Other than these initial reports, nothing further was reported on hyperopic orthokeratology until more recent times. Induced edema due to poor oxygen permeability of materials available at the time, and insufficient tear exchange behind steep fitting lenses, were the main limiting factors. More recent advances in technology and lens design have helped overcome these problems. Initial work on the effect of newer, more permeable lens materials on hyperopic OK was conducted by Swarbrick et al.² In more recent times, it has been shown that the cornea can be steepened with hyperopic OK lenses to provide predictable correction for low grades of hyperopia.^{3,4} Besides these ones, there are still few records on clinical outcomes of hyperopic orthokeratology in the peer-reviewed literature, mainly if compared to myopic treatment. To personally verify the efficacy of hyperopic orthokeratology, I decided to treat myself with this kind of refractive treatment. In this poster, I am presenting the functional results for near vision, as a part of my graduation thesis in Optics and Optometry.

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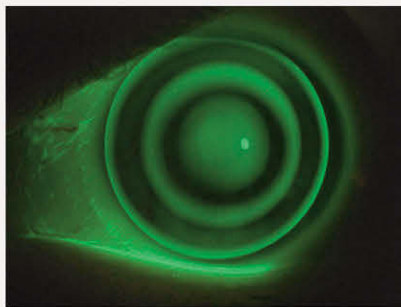
My case

- Pre-treatment refraction:
OD sph +2.25 D, VA 6/3.75
OS sph +3.00 D, VA 6/6
- Micro-esotropia (6 Δ) and slight amblyopia OS
- Without glasses I was not able to read and to maintain visual attention, but for a very short time and undemanding tasks

Treatment

- Pre-treatment data measurement
- Contact lens fitting and assessment of fluorescein pattern
- Overnight wear of ESA for hyperopia
- Daily follow-up during the first week of treatment

Contact lenses



	OD	OS
Nominal radius	7.80 mm	7.80 mm
TD	10.80 mm	10.80 mm
Target power	+2.25 D	+3.00 D

Figure 1. ESA for hyperopia for overnight wear (Esavision, TS, Italy), material: Boston XO, Dk 100 × 10⁻¹¹

Results

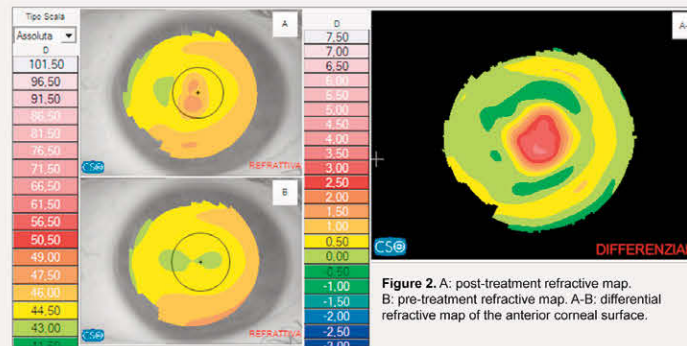
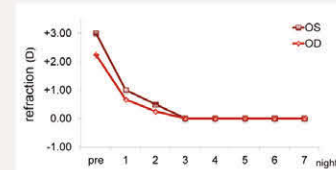
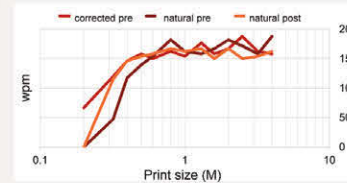


Figure 2. A: post-treatment refractive map. B: pre-treatment refractive map. A-B: differential refractive map of the anterior corneal surface.

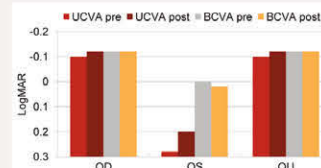
Overnight wear contact lenses were well tolerated and I observed no adverse reactions. Since the third day of treatment, I achieved complete correction and stability of results all the day long. Topographic corneal maps showed the variations in shape and refractive power in corneal anterior surface: the increased curvature of the central zone and the flattening of a paracentral ring caused an increased refractive power of the optical zone.



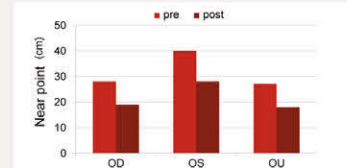
Graph 1. Since the third day of treatment, my refraction stabilized as follow:
OD plano, VA 6/4; OS plano, VA 6/6



Graph 2. MNREAD graph of reading speed in words per minute (wpm), as a function of print size



Graph 3. UCVA and BCVA for near vision



Graph 4. Near point

Discussion

Although some author reported that corneal steepening responses may be slower in onset and more variable and unpredictable than corneal flattening responses with myopic OK⁵, I actually achieved complete correction and stability of results since the third day of treatment. Overnight wear contact lenses were well tolerated, even if I am not adapted to GP lenses and usually complain of poor wearing comfort with soft contact lenses. Orthokeratologic treatment has proved to be effective in making me independent of any correction during the day. However, subjectively I noticed that my vision was less sharp than usual and I saw some halos, which anyway did not harm my ability to perform everyday visual tasks (driving, reading, computer work). I perceived the most evident benefits in near point vision, because after the treatment I did not complain about the same eyestrain I had before without correction. My near point moved closer and, even if UCVA increased only a little, I became able to read in the same way I used to do with glasses before the treatment. MNREAD Acuity Chart proved to be more sensitive than BCVA in detecting this improvement. In myopic orthokeratology, the measurement of UCVA at distance is a highly sensitive indicator of treatment efficacy. This is not true in case of hyperopic treatment. In non-presbyopic hyperopes, the main aim of optical correction is to avoid asthenopic symptoms, mainly at near.

Conclusions

Overnight orthokeratology using ESA contact lenses has proved to be effective and safe in correcting +2.25 D in one eye and +3.00 D in the other one. Correction was predictable and I reached the final result in few days, and using only one pair of contact lenses. I achieved stability of results since the third day of treatment.

References

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