

Orthokeratology fills a niche in refractive surgery practices

Cheryl Guttman
in Washington, DC

MODERN orthokeratology, or corneal refractive therapy (CRT), can be a useful adjunct to a refractive surgery practice, according to David R. Hardten MD.

“While at first glance contact lens fitting and CRT may be thought of as technologies that are competing with refractive surgery, they can actually be a wonderful complement and may even have a synergistic influence on your practice’s future growth,” Dr Hardten told attendees at a symposium on “Contact Lenses in the Refractive Surgery Practice” held during the annual meeting of the American Society of Cataract and Refractive Surgeons.

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“As a bottom line, our goal as clinicians is to address our patients’ needs, and so all forms of managing refractive error have a role in a refractive surgery practice. While CRT is not a method for correcting vision that offers the highest satisfaction level, depending on the individual situation, it can provide an appropriate and effective solution.”

Dr Hardten is associate professor of ophthalmology, University of Minnesota, Minneapolis, and director of clinical research, Minnesota Eye Consultants, Minneapolis.

Focusing on CRT, Dr Hardten explained that it fills a small, yet important niche for patients who can tolerate contact lens wear, but who would like to enjoy periods of time throughout the day with good uncorrected vision and are reluctant to undergo refractive surgery.

“It is these patients who can be good candidates for CRT, and having this option available to offer them can help with the long-term growth of your practice. Whether you specialise in refractive surgery, have a comprehensive ophthalmology focus, or work in a multi-specialty group, it is better to retain patients then refer them elsewhere with the hope that they may return in later years for their future ophthalmologic care needs,” Dr Hardten said.

New technology, new understanding

Orthokeratology was first introduced about half a century ago but it failed to gain widespread acceptance, due in part to assumptions that altering the central corneal curvature was damaging. Another problem was the absence of good technology for measuring corneal changes.

The introduction of corneal topography has permitted a more scientific approach to understanding of the mechanisms of orthokeratology and new lens technology has been introduced that makes the process of reshaping safer and more rapid, he explained.

Recent studies exploring the mechanism of orthokeratology indicate that rather than causing distortion or warpage of the cornea, orthokeratology lenses most likely act through compression to cause migration and redistribution of corneal epithelial cells with central thinning and midperipheral thickening.

However, recognising that only about 20 microns of epithelium can be displaced and applying that value in Munnerlyn’s formula indicates that at an optical zone of 6.0 mm, it is possible to achieve only about 1.75 D of refractive change.

“More effect can be achieved working with a smaller optical zone – up to 3.75 D at a 4.0mm, but with a smaller optical zone there are accompanying issues pertaining to poorer optical quality,” Dr Hardten said.

Favourable outcomes

With modern orthokeratology in which a high Dk rigid gas permeable lens is worn overnight, the desired treatment effect can usually be achieved within three to four weeks with

the use of one or two pair of lenses. That is in marked contrast to the past when orthokeratology involved daily wear of PMMA lenses for nine to 12 months and the use of an average of eight different pairs of lenses.

Good fitting is extremely important to achieving the desired effect. Too steep of a fit should be avoided as it will not produce the necessary compression in the centre, while a lens that fits too flat will result in more cell migration than desired. Good centration is also important because a lens that fits too high or too low can cause irregular astigmatism similar to that seen after a decentred LASIK or PRK treatment.

“There are definitely technical aspects in fitting that clinicians will need to work through before offering this technology to patients,” Dr Hardten said.

Results of recently published studies show that about two-thirds of patients who complete an orthokeratology regimen achieve 20/20 UCVA in the morning and retain good vision for at least six hours and 20/40 UCVA throughout most of the day.

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Patient satisfaction is also relatively high. In one study, patient satisfaction with CRT was superior to that associated with soft contact lenses and about 70% of CRT patients chose to stay with that technology at the end of the study. In another recent report, 80% of patients rated orthokeratology as a successful modality for treatment of their problems and indicated they were satisfied.

“Certainly satisfaction is not 100%, but for a lot of patients, the benefit of reduced dependence on glasses or contact lenses throughout the day is meaningful,” Dr Hardten said.

Orthokeratology is also safer than it has been in the past, but it is not without risks. Patients must be instructed that overnight wear is not the same as extended wear and that the lenses need to be removed daily. Since the lens may be stuck onto the ocular surface, patients must be sure the lens is moving before removal, and use of rewetting drops is helpful in that regard.

“As with any contact lens, there is also a risk of infectious keratitis that may be visually devastating. Therefore, these patients also must be counselled about the signs and symptoms of this complication and to seek prompt attention if they develop,” Dr Hardten stressed.

Elements of an informed decision

When offering orthokeratology to patients, practitioners need also provide a fair comparison of its advantages and disadvantages relative to refractive surgery. A key factor that appeals to many patients who select orthokeratology is that its effects are temporary -- corneal shape returns to baseline within weeks after discontinuing lens wear. However, its effects on

astigmatism correction are not very predictable and visual outcomes are better and more stable after LASIK.

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Quality of vision is also better after LASIK, since orthokeratology achieves a true optical zone of only 3.0 to 4.0 mm and can induce higher order aberrations, particularly significant spherical aberration.



David Hardten

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From a risk perspective, LASIK is accompanied by a one-time, higher risk while with orthokeratology there are multiple risk opportunities, but the risk rate is lower.

Patients who discontinue orthokeratology can wear their spectacles during the adjustment period while they are waiting for the corneal shape to return to baseline. Available evidence indicates that process is complete within about one month. However, Dr Hardten indicated he generally waits about three months before performing refractive surgery if the patient has decided to proceed with that method for vision correction.

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