

**The Optometric Trends Discovery Group's
2023 Report on**

Keratoconus: INSIGHTS & TRENDS

**By Dr. Gloria B. Chiu
OD, FAAO, FSLs**



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Optometrists play a crucial role in the early diagnosis and management of **keratoconus**, often coordinating care with ophthalmologists for treatments like corneal collagen cross-linking. This collaborative approach allows for comprehensive patient care, from initial detection to advanced treatment interventions.

We'll review data from the 2023 Optometric Trends Discovery Group (OTDG) Survey to gain insights into clinical practice patterns and opinions of US optometrists as they relate to keratoconus with a focus on corneal collagen cross-linking.

Diagnosing Keratoconus

Survey respondents reported that on average they saw 19 cases of keratoconus in the past year, though most (52%) saw 10 or fewer. To me this suggests underdiagnosis. The estimated prevalence of keratoconus varies by study and location. An older study in the US found keratoconus had a prevalence of 0.05% (1 in 2000)¹, while more recent studies in Saudi Arabia and Iran reported much higher rates of 4.79%² and 2.5%³, respectively. If a doctor saw 15 patients per day, five days a week, over 11 months annually, and with keratoconus' prevalence reasonably estimated at 1%, an average doctor should expect to see around 33 keratoconus patients annually. The fact that such numbers are rarely reported by doctors suggests a widespread underdiagnosis of keratoconus.

As seen in Figure 1, there are a plethora of tools being used by doctors to diagnose keratoconus. This is reassuring, as it demonstrates a comprehensive approach to identifying this condition. Common tools like keratometry, refraction results, and topography are extensively used because of their effectiveness and ease of access. However, the value of tomography may be underappreciated. Tomography allows for the earliest detection of keratoconus due to its ability to reveal posterior elevation, which can

sometimes be detected even before anterior elevation abnormalities. This is an advantage over topography, which only provides information on the cornea's anterior surface. Additionally, tomography offers a comprehensive view of the cornea, including global pachymetry which is critical for identifying abnormal thinning. For instance, if the cornea's thickness is significantly less than the average of 550 micrometers, this could be indicative of ectasia or keratoconus.

One option here, genetic testing, has emerged as an intriguing adjunct to the array of diagnostic tools for keratoconus, particularly for patients who don't present with clear-cut clinical signs or who have a family history suggestive of the condition. When asked about corneal refractive surgery candidates, who are keratoconus suspects, the survey revealed that 33% of respondents are not using genetic testing in these patients at all whereas 15% use it in all such patients. I don't think that it's necessary to do for everybody, but it does have enough value in borderline cases that it should be used in some patients. Currently, there has been a pause in market availability for keratoconus genetic testing, but I'm hopeful the tool will be available again in the future.

1. Kennedy, R. H., Bourne, W. M., & Dyer, J. A. (1986). A 48-year clinical and epidemiologic study of keratoconus. *American journal of ophthalmology*, 101(3), 267-273
2. Netto, E. A. T., Al-Otaibi, W. M., Hafezi, N. L., Kling, S., Al-Farhan, H. M., Randleman, J. B., & Hafezi, F. (2018). Prevalence of keratoconus in paediatric patients in Riyadh, Saudi Arabia. *British Journal of Ophthalmology*, 102(10), 1436-1441.
3. Hashemi, H., Khabazkhoob, M., Yazdani, N., Ostadimoghaddam, H., Norouzirad, R., Amanzadeh, K., ... & Yekta, A. (2014). The prevalence of keratoconus in a young population in Mashhad, Iran. *Ophthalmic and Physiological Optics*, 34(5), 519-527.

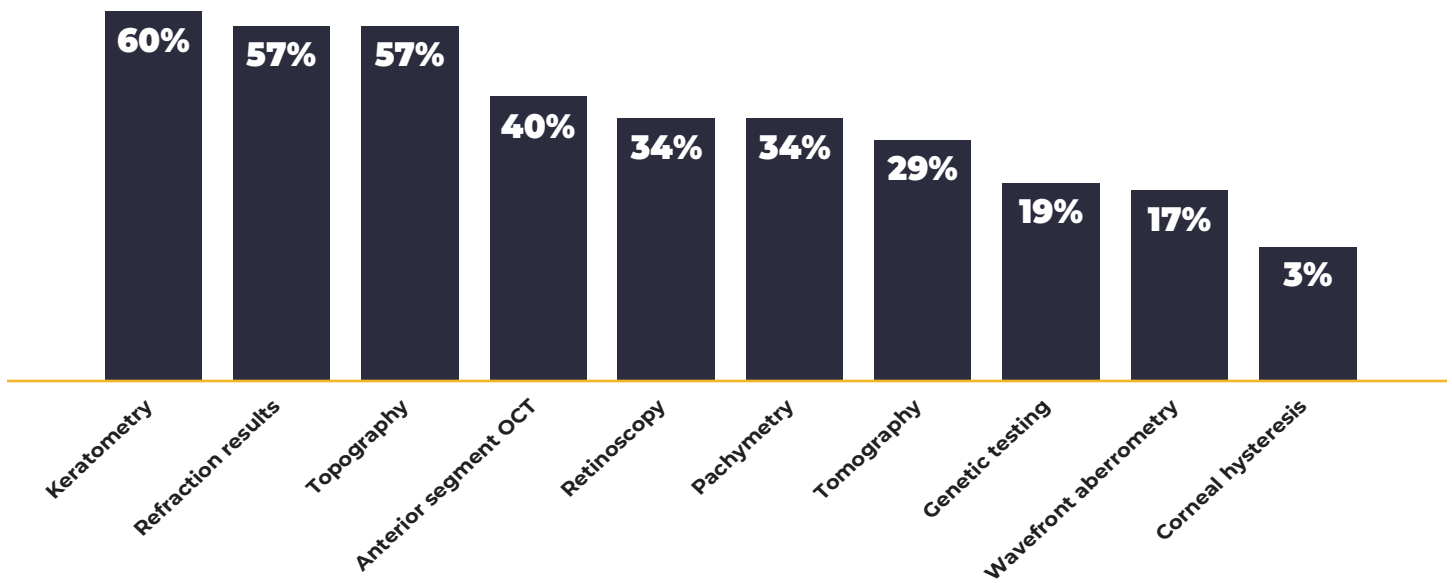


FIGURE 1. What do you use to diagnose keratoconus? (Select all that apply.)

“Eye care providers need to refer out when necessary, especially if they are not equipped to co-manage keratoconus appropriately.”

Corneal Collagen Cross-Linking for the Treatment of Keratoconus

As shown in Figure 2, a reassuring 90% of respondents advocate for corneal cross-linking to manage progressive keratoconus. This treatment is pivotal, as it’s the sole option for slowing or stopping the disease’s progression. Contact lenses and other interventions like corneal intacs do not address disease progression; they only assist with vision correction. In advanced cases, where significant scarring and thinning occur, a corneal transplant may become necessary for vision improvement. However, unlike cross-linking, corneal intacs, despite temporarily supporting the cornea’s shape, do not alter the tissue permanently and can be removed if complications arise.

In light of the previously mentioned results, it’s somewhat surprising that only 41% of respondents currently co-manage cross-linking patients, with 25% having no intention to do so, as shown in Figure 3. It is hoped that further evidence and case studies demonstrating the effectiveness of cross-linking will encourage these professionals to reconsider. If they prefer not to co-manage, referrals to providers who do should be considered. For areas without cross-linking services, referring patients is crucial to prevent progression and irreversible corneal damage. Eye care providers need to refer out when necessary, especially if they are not equipped to co-manage keratoconus appropriately.

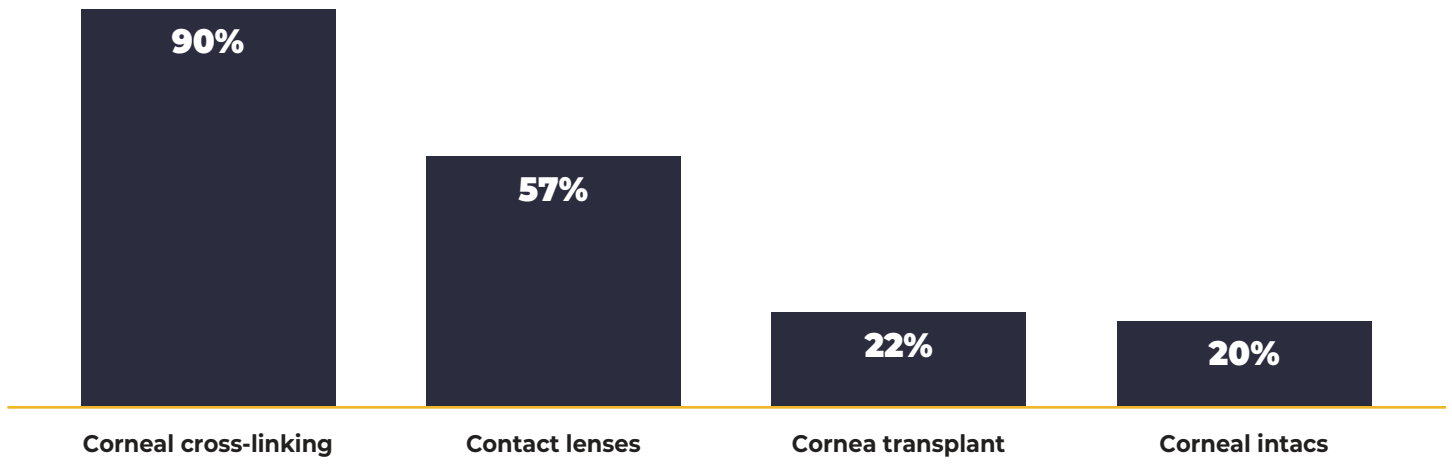


FIGURE 2. Which treatment options do you recommend for progressive keratoconus? (Select all that apply)

One possible explanation for these differing attitudes towards cross-linking co-management may be the heterogeneity of perceived responses to the treatment. As shown in Figure 4, some respondents report that 12 months after performing corneal collagen cross-linking no patients showed progression on their Kmax

reading and others report nearly all patients saw progression. In my clinical experience, it's uncommon for corneas to continue steepening after cross-linking; they are more likely to flatten out as time goes on, which is reassuring for both patients and clinicians monitoring the effectiveness of the treatment.

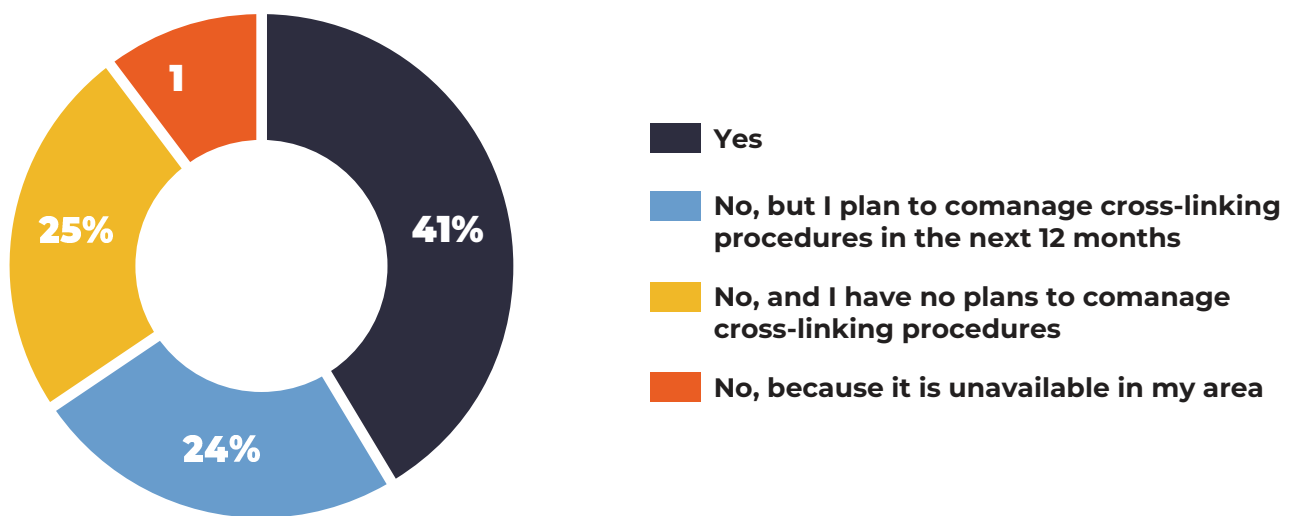


FIGURE 3. Are you currently comanaging corneal collagen cross-linking patients?

The most frequently cited barrier to referring patients for corneal cross-linking is concerns over insurance coverage, as noted by 83% of the respondents. This far outweighs the next biggest and related concern which is FDA approval status (32%). This is noteworthy, especially since corneal cross-linking received FDA approval in the United States in 2016. While initial insurance coverage was indeed sparse, it has notably improved over the years. Obtaining prior authorization can be a detailed process, potentially involving peer-to-peer reviews and the submission of documentation showing changes in the patient's manifest refraction and ocular shape, such as increased astigmatism or corneal steepening. Thankfully, a greater number of insurance providers are now covering FDA-approved corneal cross-linking, which should alleviate some concerns about offering this treatment. It is essential, therefore, to ensure that the version of cross-linking offered is indeed the FDA-approved method. Other non-approved cross-linking protocols will unlikely be covered by medical insurance. The improvement in insurance coverage is encouraging, and it is hoped that this will lead to more widespread offering and utilization of corneal cross-linking, considering its proven efficacy and FDA approval status.

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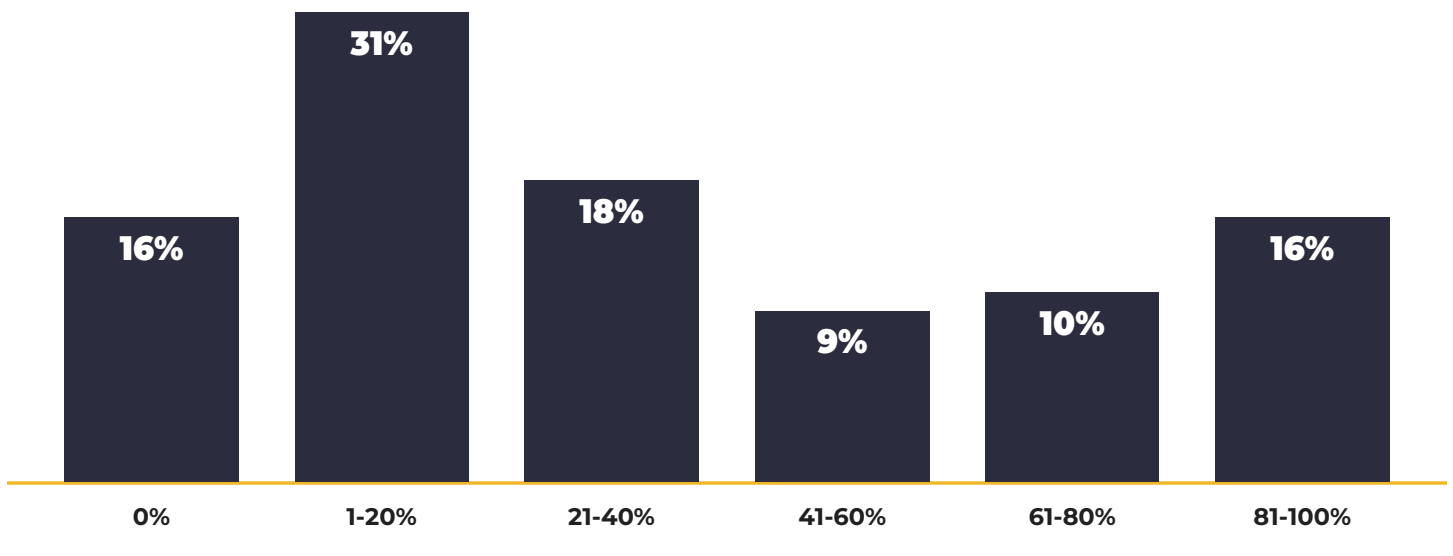


FIGURE 4. What percentage of your keratoconus patients have no progression on their Kmax reading 12 months after performing corneal collagen cross-linking?

Did you KNOW?

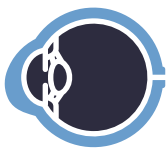


19
the average number of
keratoconus patients
respondents saw
in the past year



58%
of respondents believe
that it is very important to
review keratoconus risk
factors in EVERY corneal
refractive surgery candidate

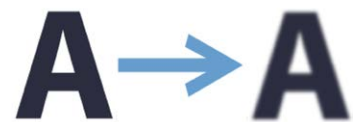
Top 3 tools used to determine suitability for corneal collagen cross-linking (based on respondents):



63%
Progression of
keratometry
and Kmax



58%
Change in
topography



50%
Change in best
corrected visual acuity

The Optometric Trends Discovery Group



(OTDG) Survey was launched on February 4, 2023. The survey included 141 questions developed and reviewed with the OTDG leadership board. The survey questions explored doctors' understanding and current practice patterns across a number of areas of optometric care, including presbyopia, astigmatism, corneal therapeutics, ocular surface disease, glaucoma, lid management, corneal refractive surgery, dry AMD and geographic atrophy, and myopia management.

Nearly 300 optometrists responded to the survey which was closed in mid-March 2023. You can access interpretive reports on additional OTDG topics as they are released by visiting otdg.tfgeducation.com or scanning the QR code.



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Meet the Author

Dr. Gloria B. Chiu
OD, FAAO, FSLs



Dr. Gloria Chiu is an Associate Professor of Clinical Ophthalmology at the USC Roski Eye Institute, Department of Ophthalmology, at the University of Southern California Keck School of Medicine. She received her Doctor of Optometry at the University of California, Berkeley, School of Optometry and completed a residency in Cornea and Contact Lenses at the Southern California College of Optometry, where she still serves as an adjunct faculty member.

Her clinical interests include contact lens fittings and treatment for patients with ocular surface disease and irregular corneas. Her research interests include microbial contamination in contact lens-related solutions and effects of scleral lens wear on the ocular surface and optic nerve.

She is a fellow of the American Academy of Optometry and the Scleral Lens Education Society, and a member of the California Optometric Association. She publishes frequently in ophthalmic journals and magazines.

She was named one of America's Best Eye Doctors in 2021 by Newsweek and GP Practitioner of the Year by the Gas Permeable Lens Institute in 2023.