

## Case Report

# Unilateral Photorefractive Surgery in a Keratoconus Patient with Anisometropia and History of Corneal Cross-Linking: a Case Report

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### Article Notes:

Received: Jul. 10, 2017

Received in revised form:

Jul. 29, 2017

Accepted: Aug. 12, 2017

Available Online: Sep. 26, 2017

### Key words:

Keratoconus

Cross-Linking

Photorefractive Keratectomy

Surgery

### Abstract

Photorefractive keratectomy (PRK) is a common procedure for correction of refractive errors. Corneal collagen crosslinking (CXL) is a procedure used to strengthen a weakened ectatic cornea and is mainly used as a therapeutic procedure in keratoconus (KC) patients to prevent disease progress and improve visual acuity. PRK-CXL combination performed simultaneously or sequentially, has been suggested in KC patients to provide improved visual acuity, in addition to halting the ectatic progression. Our case was a patient with KCN and visual deterioration who underwent accelerated CXL with good results and 1 year later his right eye was subjected to PRK due to anisometropia. The patient achieved an uncorrected visual acuity of 10/10 without any complications for both eyes. Our good results suggest that PRK-CXL combination might be considered for correction of decreased visual acuity and anisometropia in patients with KCN. However, more studies are required to further evaluate the surgical outcome and safety of this procedure.

**How to cite this article:** Gohari M, Jahanifard V. Unilateral Photorefractive Surgery in a Keratoconus Patient with Anisometropia and History of Corneal Cross-Linking: a Case Report. *Journal of Ophthalmic and Optometric Sciences*. 2017;1(5):37-40.



## Introduction

Keratoconus is an ectatic corneal disease that decreases vision due to progressive increase in myopia and astigmatism and is characterized by progressive corneal protrusion and thinning, which causes irregular astigmatism and impairment in visual function<sup>1</sup>. Today, keratoconus treatment is one of the most challenging treatments in ophthalmology. Two main aims of treatment are preventing the progression of keratoconus and improving the patient's visual acuity. During the past twenty years several new methods for visual rehabilitation of keratoconus patients have been introduced including special contact lens designs, photorefractive keratectomy (PRK), intrastromal corneal ring segments, collagen cross-linking, phakic intraocular lenses, and penetrating or lamellar keratoplasty<sup>2,3</sup>. Accelerated epithelium-off cross-linking (AXL) has been developed to reduce the treatment time and prevent keratoconus progression, and its combination with refractive procedures such as PRK and intracorneal ring segments (ICRS) to reduce the refractive error among keratoconus patients, has been promoted<sup>4-6</sup>. There are several reports of success and improvement of visual acuity after simultaneous PRK and CXL<sup>3,6</sup>. Here we report a case of KCN who underwent accelerated CXL to prevent keratoconus progression and one year later PRK was performed to reduce anisometropia and improve his binocular vision.

## Case report

A 34-year-old male, who was known to have KCN, underwent CXL for both eyes to stop disease progression in our clinic. After this procedure his uncorrected visual acuity was 20/50 (+ 0.40 LogMAR) with plano - 3.25 cyl \* 35 in right eye and 20/20 (0.0 LogMAR) with -

1.25 sph - 3.75 cyl \* 156 in left eye and BCVA 20/20 (0.0 LogMAR) for both eyes. Because of this anisometropia he became a candidate for refractive surgery on right eye. His right eye topographic details was K1 : 41 D, K2 : 44.7 D, Kmax : 48.5 D and thinnest point : 486  $\mu$ m in pentacam (Pentacam HR, Oculus, Inc) and his KCN indices did not progress during one year after CXL (Figure 1,2). The patient underwent right eye TG-PRK (manifest ref. - 0.25 sph - 2.5 cyl \* 40 , OZ : 6.3 mm , AD : 40  $\mu$ m) and after 3 months of surgery, his refraction was plano - 1.5 cyl \* 23 and SE: - 0.75 with UCVA 20/20 (0.0 LogMAR) for both eyes. His anisometropia improved and he was pleased with his binocular vision without glasses.

## Discussion

Today, PRK is considered as an alternative treatment for KCN when used in conjunction with CXL<sup>3</sup>. CXL uses UVA to activate riboflavin and create covalent bonds between collagen fibrils, resulting in increased biomechanical strength of the cornea<sup>2,3</sup>. The goals of simultaneous PRK/CXL treatment are to strengthen the cornea and stop disease progression with CXL and improve vision through laser ablation<sup>3</sup>. The combination of PRK and CXL has had good results to improve vision in mild and stable keratoconus patient<sup>1-3,7</sup>. In our patient the PRK with the Excimer laser platform after accelerated CXL was safe and effective for treating refractive errors in a keratoconus patient. However, large-scale, comparative, randomized trials are required to determine the optimum parameters and most suitable patients for this combination therapy.

## Conclusion

The use of PRK after CXL to improve

visual acuity was successful in our case and resulted in reduced anisometropia without any complications. Further large scale studies are needed to determine the optimum parameters and most suitable patients for this combination therapy.

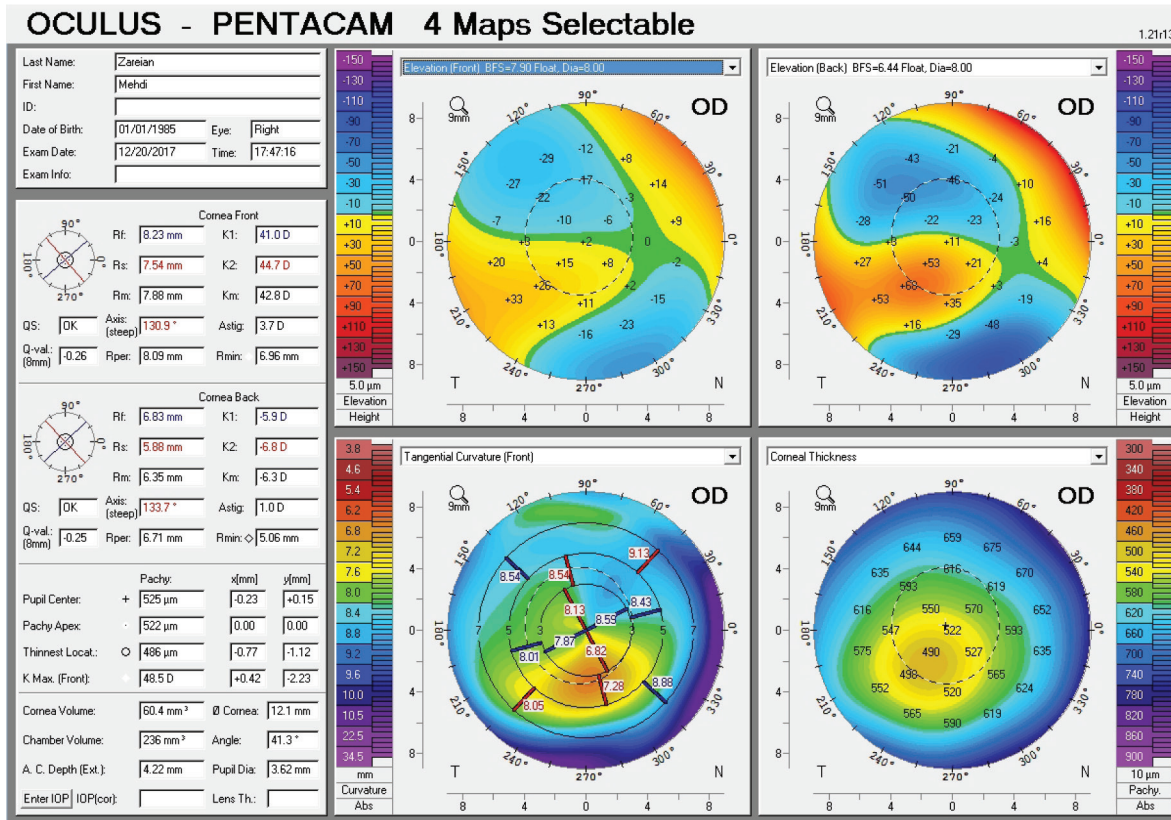


Figure 1: Pentacam findings of the patient before surgery

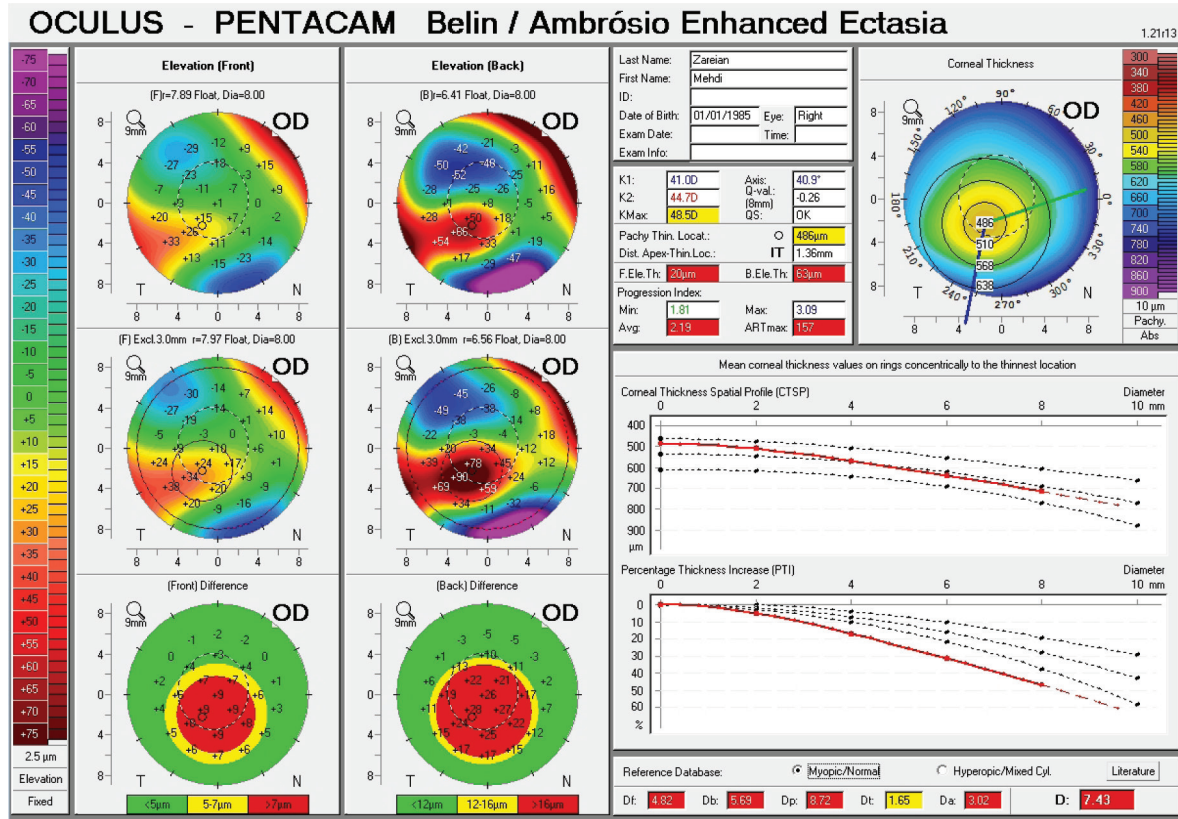


Figure 2: Pentacam findings of the patient before surgery

**References**

1. Vazirani J, Basu S. Keratoconus: current perspectives. *ClinOphthalmol.* 2013;7:2019-30.
2. Tambe DS, Ivarsen A, Hjortdal J. Photorefractive Keratectomy in Keratoconus. *Case Rep Ophthalmol.* 2015;6(2):260-8.
3. Fadlallah A, Dirani A, Chelala E, Antonios R, Cherfan G, Jarade E. Non-topography-guided PRK combined with CXL for the correction of refractive errors in patients with early stage keratoconus. *J Refract Surg.* 2014;30(10):688-93.
4. Iqbal M, Elmassry A, Tawfik A, Elgharieb M, Nagy K, Soliman A, et al. Standard cross-linking versus photorefractive keratectomy combined with accelerated cross-linking for keratoconus management: a comparative study. *ActaOphthalmol.* 2019;97(4):e623-e31.
5. Hafezi F, Mrochen M, Iseli HP, Seiler T. Collagen crosslinking with ultraviolet - A and hypoosmolar

- riboflavin solution in thin corneas. *J Cataract Refract Surg.* 2009;35(4):621-4.
6. Sakla H, Altroudi W, Muñoz G, Albarrán-Diego C. Simultaneous topography-guided partial photorefractive keratectomy and corneal collagen crosslinking for keratoconus. *J Cataract Refract Surg.* 2014;40(9):1430-8.
7. Kymionis GD, Kontadakis GA, Kounis GA, Portaliou DM, Karavitaki AE, Magarakis M, Simultaneous topography-guided PRK followed by corneal collagen cross-linking for keratoconus. *J Refract Surg.* 2009;25(9):S807-11.

**Footnotes and Financial Disclosures**

**Conflict of Interest:**

The authors have no conflict of interest with the subject matter of the present manuscript.