CASE REPORT
COMPLEMENTARY TREATMENT OF KERATOCONUS WITH LASEK AFTER INTACS AND CORNEAL CROSSLINKING

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ABSTRACT:

Objectives: To report results of six eyes of four patients with keratoconus that underwent complementary treatment with LASEK after INTACS and corneal crosslinking.

Methods: Patients underwent implant of INTACS corneal rings. Three months later corneal crosslinking was made. Three months after crosslinking patients went to the operating room and LASEK was performed. Initial and final best corrected visual acuity; corneal topography and corneal pachimetry were assessed during the follow-up period.

Results: All patients experienced improvement in uncorrected and best corrected visual acuity. Corneal topography and pachimetry were stable throughout the follow-up period without clinical signs of ectasia.

Conclusions: Complementary treatment with LASEK after INTACS and corneal crosslinking was accomplished in patients with keratoconus. This surgical approach may be an option for patients with keratoconus that want to get rid of contact lenses and spectacles. These findings support further cautious evaluation in order to determine safety and long-term outcome.

INTRODUCTION

In Keratoconus, the cornea experiences a progressive thinning that usually evolves to leucoma and hydrops[1]. INTACS (Addition Technology, Inc) corneal rings implant has been used for the treatment of keratoconus and ectasia after refractive surgery[2-3]. INTACS improve visual acuity and corneal topography[4], permitting better tolerance to contact lenses[5]. Corneal Crosslinking is a photo-oxidative procedure that produces covalent unions between collagen molecules[6]. These unions stabilize and increase corneal rigidity[7]. Combined treatment with INTACS and crosslinking has shown clinical improvement in keratoconus and corneal ectasia[8]. We report six eyes of four patients who underwent complementary treatment of keratoconus with LASEK, after INTACS and corneal crosslinking.

CASE REPORT

Case No. 1

Clinical and topographic outcome are shown in Figure 1, 2 and 3. Twenty nine year old female with keratoconus OD. Uncorrected visual acuity 20/800. Refraction -14.00 = -5.00 x 10º, keratometry 43.09 x 47.57 17º, and 429 microns pachimetry. The patient underwent ICI -450 -150 INTACS implant with the incision made at 107º and 440 microns depth. Eight months after her initial procedure corneal crosslinking was performed. Four months after corneal crosslinking uncorrected visual acuity was 20/100 with a mean refraction of -7.50 = -6.00 x 25º, keratometry 38.86 x 42.05 31º, and 436 microns pachimetry. LASEK was performed with a multizone ablation profile. At her last visit 7 months later uncorrected visual acuity was 20/25 with a mean refraction of +0.25 = -3.00 x 25º, keratometry 30.73 x 31.78 63º and 335 microns pachimetry. No signs of corneal ectasia or progression of keratoconus were present.

Case No. 2

Forty nine year old male with diagnosis of keratoconus OU. Uncorrected visual acuity 20/200 OD, mean refraction plano = -4.50 x 70º, keratometry 44.39 x 48.79 68º, and 565 microns pachimetry. Uncorrected visual acuity 20/400 OS, mean refraction -0.50 = -7.00 x 100º, keratometry 42.69 x 56.26 86º, 543 microns pachimetry. The patient underwent ISK -450 -150 INTACS implant OU, with incisions made at 158º OD and 176º OS, and 430 microns depth OU. Five months later corneal crosslinking was performed. Uncorrected visual acuity was 20/70 OD, mean refraction +5.00 = -6.00 x 75°, keratometry 39.93 x 44.51 68º and 597 microns pachimetry. Uncorrected visual acuity 20/200 OS, mean refraction -4.00 = -8.00 x 90º, keratometry 52.94 x 43.19 93º, and 563 microns pachimetry. ORK/CAM LASEK OD and multizone LASEK OS were performed four months after corneal crosslinking. At his last visit, five months later, uncorrected visual acuity was 20/20-1 OD, mean refraction +0.75 = -3.00 x 30º, keratometry 43.20 x 46.80 35º, and 475 microns pachimetry. Uncorrected visual acuity was 20/50 OS, mean refraction +3.50 = -4.75 80º, keratometry 37.80 x 45.80 a 84º, and 441 microns pachimetry. No signs of corneal ectasia or progression of keratoconus were present OU.

Case No. 3

46 year old male with keratoconus OD. Uncorrected visual acuity 20/800 OD, mean refraction -7.00 = -6.25 x 180º, keratometry 51.54 x 47.78 77º, and 420 microns pachimetry. ICI -450 -150 INTACS implant was performed, with incision made at 170° and 420 microns depth. Four months later uncorrected visual acuity was 20/50 with a mean refraction of -5.00 = -7.00 x 175º, keratometry 48.32 x 50.35 173º, and 427 central pachimetry. Corneal crosslinking was performed. Seven months later uncorrected visual acuity was 20/100, mean refraction -2.50 = -4.75 x 15º, keratometry 45.51 x 49.80 89º, and 488 microns pachimetry. Multizone LASEK was carried out. At his last visit, four months later, uncorrected visual acuity was 20/50, mean refraction -1.50 = -1.50 x 17º, keratometry 42.30 x 46.20 17º, and

382 corneal pachimetry. No signs of corneal ectasia or progression of keratoconus were present.

Case No. 4

30 year old male with diagnosis of keratoconus OU. Uncorrected visual acuity 20/800 OD, mean refraction -12.00 = -4.00 x 45º, keratometry 48.57 x 51.30 56º, and 452 microns central pachimetry. Uncorrected visual acuity 20/800 OS, mean refraction -11.00 = -6.00 a x 130º, keratometry 53.15 x 47.94 118º, and 444 microns central pachimetry. ICI -450 -150 INTACS implant was executed, with an incision made at 140° OD and 165° OS, and 360 microns depth. Twelve months later uncorrected visual acuity OD was 20/800, mean refraction -8.75 = -2.75 x 45º, keratometry 45.97 x 47.37 59º, and 441 microns pachimetry. Uncorrected visual acuity 20/800 OS, mean refraction de -7.75 = -2.25 140º, keratometry 45.95 x 48.91 75º, and 438 microns pachimetry. Corneal crosslinking was performed OU. Three months later uncorrected visual acuity was 20/800 OD, with a mean refraction of -7.75 = -1.75 x 40º, keratometry 45.23 x 46.52 51º, and 494 microns central pachimetry. Uncorrected visual acuity was 20/800 OS, mean refraction -7.50 = -3.00 x 140º, keratometry 45.39 x 46.96 125º, and 496 microns pachimetry. Multizone LASEK was carried out OU. At his last visit, five months after LASEK, uncorrected visual acuity was 20/130 OD, mean refraction -3.25 = -1.00 x 85º, keratometry 44.20 x 43.57 121º, and 378 microns pachimetry. Uncorrected visual acuity 20/400 OS, mean refraction -4.75 = -1.25 x 125º, keratometry 44.80 x 44.28 101º, and 427 central pachimetry. No signs of corneal ectasia or progression of keratoconus were present OU.

Discussion

Keratoconus is a corneal disease that has been treated with corneal ring implants and corneal crosslinking. Combining these alternatives may have a potential additive clinical effect[13]. Refractive surgery with corneal wavefront after INTACS

implant has been made with promising results[9]. To our knowledge, this is the first report of intraestromal rings, corneal crosslinking and LASEK for patients with keratoconus. This case report shows six eyes of four patients that improved uncorrected visual acuity and refraction with this treatment, with stability and no signs of progression during follow-up. This results support initial evidence of safety and security for the management of keratoconus with LASEK after INTACS and corneal crosslinking. Changes generated after this set of interventions are reflected in improvement of uncorrected visual acuity, refraction and keratometry. Further experience and larger patient sample with longer follow-up are needed in order to firmly determine if these suggested benefits are of clinical relevance.

References

1. Rabinowitz YS. Keratoconus. Surv Ophthalmol 1998; 42: 297-319.
2. Koch DD. Refractive surgery for keratoconus: a new approach. J Cataract Refract Surg 2000; 26: 1099-1100.
3. Alió JL, Shabayek MH, Belda JI, et al. Analysis of results related to good and bad outcome of INTACS implantation correction for keratoconus. J Cataract Refract Surg 2006; 32: 756-761.
4. Siganos CS, Kymionis GD, Kartakis N, et al. Management of keratoconus with INTACS. Am J Ophthalmol 2003; 135: 64-70.
5. Rabinowitz YS. Intacs for Keratoconus. Curr Opin Ophthalmol. 2007 Jul; 18(4):279-83.
6. Wollensak G. Cross linking treatment of progressive keratoconus: new hope. Curr Opin Ophthalmol 2006; 17: 356-360.
7. Mazzota C, Traversi C et al. Conservative treatment of keratoconus by riboflavin-uva-induced cross-linking of corneal collagen: qualitative investigation. Eur J Ophthalmol. 2006 Jul-Aug; 16(4):530-5.

8. Kamburoglu G, Ertan A. Intacs implantation with sequential collagen cross-linking treatment in postoperative LASIK ectasia. J Refract Surg. 2008 Sep; 24(7):S726-9
9. Hirsh A, Barequet IS, Levinger S. Wavefront-guided lasek after intacs in eyes with stable keratoconus. Harefuah. 2006 Mar; 145(3):181-2, 247-8.

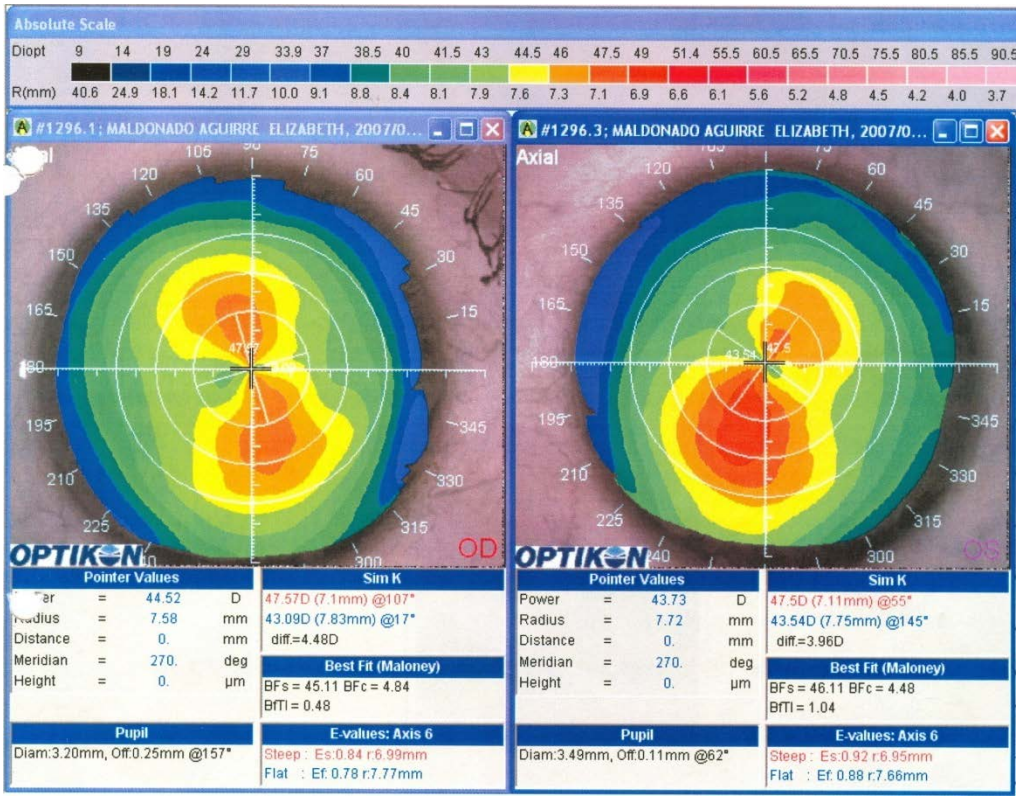

Figure 1. Corneal Topography case N° 1.

Corneal topography showing keratoconus OU. INTACS implant was performed in OD.

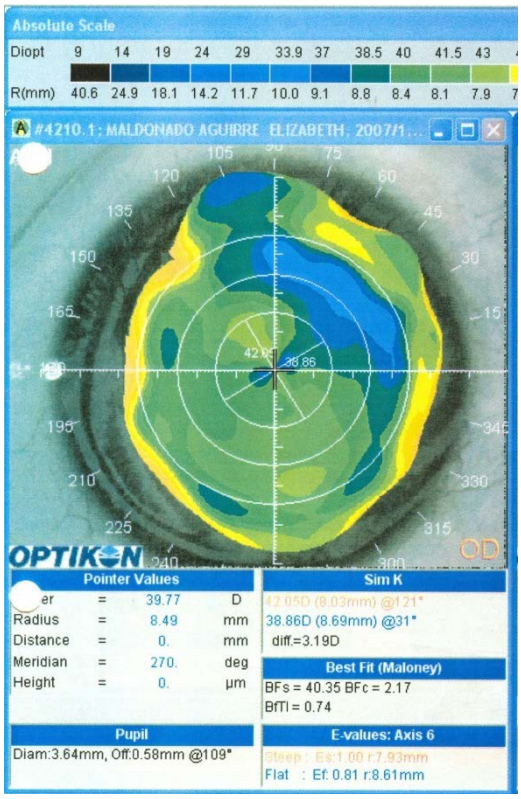

Figure 2. Corneal Topography OD after INTACS implant and corneal crosslinking. Corneal topography showing flattening of corneal surface. Inferior steepening has disappeared and keratometry is decreased.

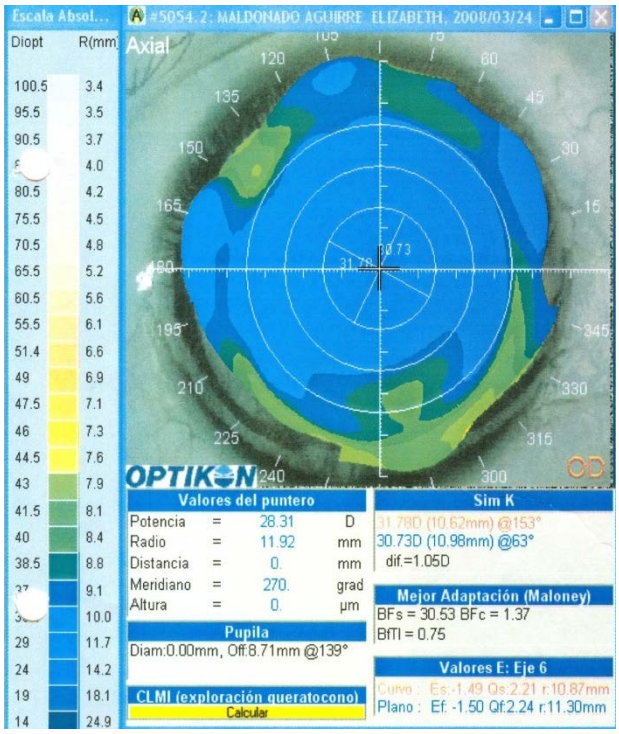

Figure 3. Corneal topography OD after LASEK.

Corneal topography shows flattening of corneal surface and improvement in astigmatism.