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CASE REPORT

# INTACS 210° in Post-LASIK Ectasia: Follow-up of Clinical and Biomechanical Changes

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## ABSTRACT

The authors report a case of a post-LASIK corneal ectasia with low refractive defect and progressive decreased visual acuity. INTACS SK 210° arc in 7 central millimeters was implanted, 1 year postoperative showed a decreased in maximum keratometry, vertical coma and improved visual acuity. Two years postoperative topography evidence progression of the ectasia.


**Keywords:** Intacs 210, Post-LASIK ectasia, Cornea.

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**Conflict of interest:** None declared

## INTRODUCTION

The progression of the corneal steep area and the deterioration in visual acuity is strongly associated with corneal ectasia as a complication of laser *in situ* keratomileusis (LASIK). This is related to the weakening of the cornea's mechanical strength.[1] These cases can be managed with contact lens,[2] intracorneal ring segments (ICRS),[3-6] corneal collagen cross-linking[7] and lamellar or penetrating keratoplasty.[8,9] Therapeutic options, such as ICRS like INTACS are attractive to treat post-LASIK corneal ectasia because of their reversibility, different authors have been using them,[3-6] but in all cases they used Intacs of 150° of arc. Reports of Ferrara rings of 210° of arc in 5 central milimeters (mm), shows that the best indications for these rings are in central cones.[10] This report evaluates biomechanical and clinical changes in a case of decentered post-LASIK corneal ectasia using INTACS SK 210° arc in 7 central mm.

## CASE REPORT

A 29-year-old man attended in 2010 for progressive decreased visual acuity in his right eye, during the last two years, he had LASIK elsewhere 5 years before to correct –3.75 diopters of myopia. The uncorrected distance visual acuity (UCVA) was 20/100 with a refraction of +2,25 –3.00 × 67 with a best spectacle corrected visual acuity (BSCVA) of 20/80. Corneal evaluation was performed using Keratron Scout topographer (Optikon, Rome, Italy), and GALILEI Dual Scheimpflug Analyzer (Ziemer Ophthalmic Systems, Port, Switzerland). At the axial map an inferior steepening was observed with a maximum keratometry of 56,00 Diopters and a superior flattening that occupied the superior half of the cornea as shown in Figure 1. Post-LASIK corneal ectasia, was diagnosed and intracorneal ring segment (INTACS) insertion surgery was programed.

An INTACS SK 210° arc (AJL, Ophthalmic S, A, Miñano, Spain) was implanted in a tunnel of central 7 mm inferiorly in a depth attempt of 80% with an automated vacuum centering guide (AJL, Ophthalmic S, A, Miñano, Spain) according to INTACS Nomogram 2.2.

Three months after INTACS insertion corneal cross-linking was proposed, but the patient did not accept the procedure. Then a clinical follow-up had been realized yearly (Table 1).

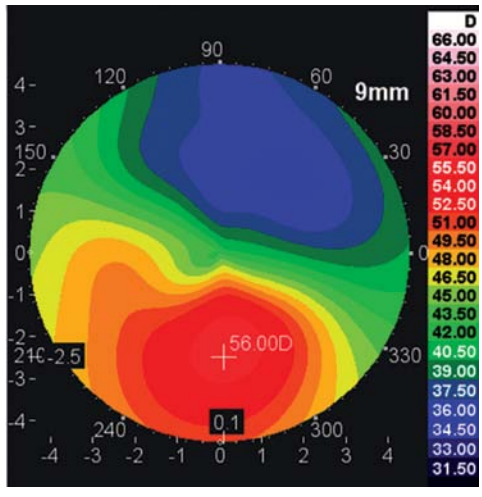


**Fig. 1:** Preoperative right eye axial map shows a post-LASIK corneal ectasia, in 2010

**Table 1:** Clinical and topographical follow-up

| | *2010* | *2011* | *2012* | *2013* |
|---|---|---|---|---|
| UCVA | 20/100 | 20/60 | 20/60 | 20/60 |
| BSCVA | 20/40 | 20/30 | 20/30 | 20/30 |
| Refraction | +2,25-3,00 x 67 | +0,25-2,25 x 70 | +0,75-2,25 x 70 | +1,25-2,25 x 65 |
| Z(3,–1) | –3,76 | –2,07 | –2,02 | –2,17 |
| Flat Sim K | 41,87 x 47 | 40,02 x 66 | 38,35 x 52 | 39,04 x 65 |
| Steep Sim K | 43,62 x 137 | 42,48 x 156 | 40,44 x 142 | 40,81 x 155 |

UCVA: Uncorrected distance visual acuity; BSCVA: Best spectacle corrected visual acuity; Z(3-1): Corneal vertical coma; Flat Sim K: Flat simulated keratometry; Steep Sim K: Steep simulated keratometry.

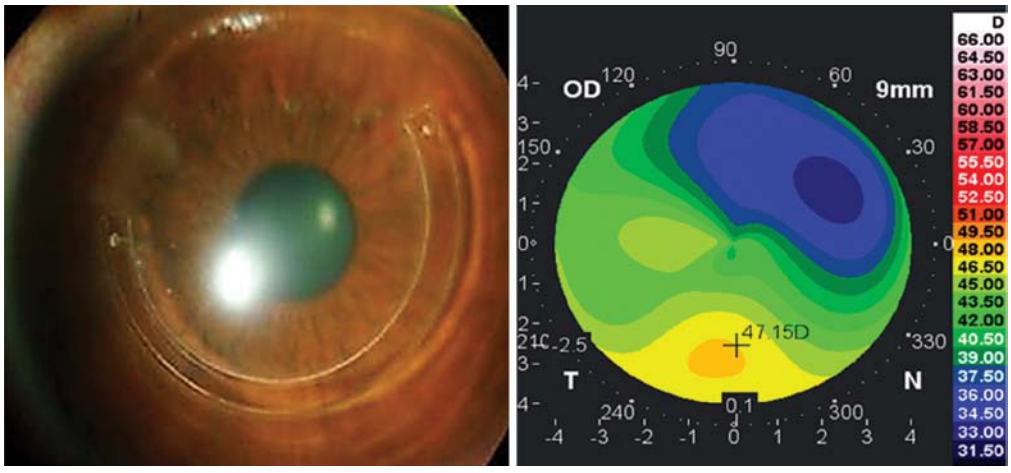


**Fig. 2:** Post-ICRS photograph and axial map 1 year postoperative (2011)

One year postoperative a satisfied result was achieved, with a decreased of the $K_{max}$ at the inferior steepening of 8.85 diopters (Fig. 2), and in the wavefront analysis a decrease in the vertical coma from –3.76 to –2.07 microns. During the second and third year the clinical and tomographic evaluation revealed a progression of the ectasia with an increase of the steepest area (Figs 3 and 4). The BSCVA has been stable, with 20/30 for 3 years postoperatively.

## DISCUSSION

ICRS has been used to remodel the shape of the ectatic cornea, in order to delay or avoid a corneal transplant. In post-LASIK ectasia besides anatomical reconstruction, we look for the stabilization of the cornea, adding cross-linking as a complementary procedure.

Our findings of decreased $K_{max}$, 1 year postoperative after ICRS implantation with evident remoldelation of the cornea, with an improve in 1 line in UCVA and 3 lines in BSCVA (Fig. 2), shows us, the eficacy of the INTACS SK 210° arc in 7 central mm, in decentered ectasia as a first case reported because the cases of 210 of ICRS reported were in central keratoconus and in pellucid marginal corneal degeneration.[10,11] Other authors found good results in post-LASIK ectasia using one inferior 150° ring segment.[12-15]

We found refractive stability 3 years after ICRS implantation similar to Kymionis et al[5] who published it after 5 years, but in our case we find out in the axial map a progression toward ectasia, analizing the steepest ectatic area (Figs 3 and 4).

Unfortunately in this case cross-linking was not performed to achieve stabilization of the disease, as the report of Poli M et al,[16] who did corneal collagen cross-linking with UVA-riboflavin in 8 post-LASIK ectasia patients and could stabilize the progression after 3 years of follow-up. In the literature there are two report cases using sequential ICRS and cross-linking treatments[17,18] obtaining good results in corneal stability.

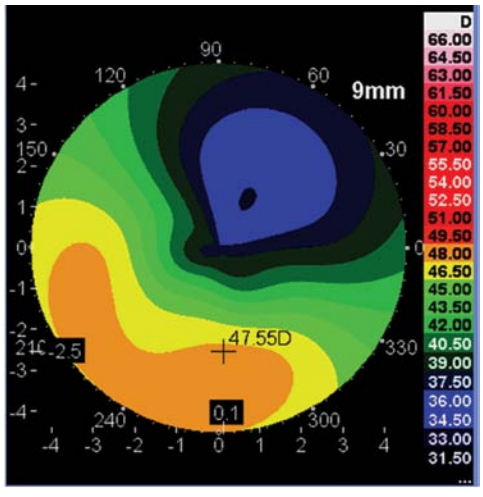


**Fig. 3:** Second year postoperative (2012)

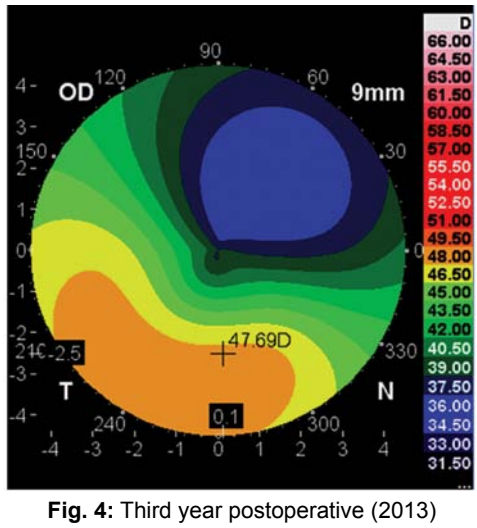


**Fig. 4:** Third year postoperative (2013)

## CONCLUSION

In this case, it was effective to use INTACS SK 210° arc in 7 central mm in a decentered post-LASIK corneal ectasia with a low refractive defect. And because of the evident progressive ectasia, it would be better to do an additional early cross-linking.

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