

Post photorefractive keratectomy corneal ectasia

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Dear Editor,

We write to describe two cases of corneal ectasia occurred after photorefractive keratectomy. Due to the wide diffusion of refractive surgery, many ophthalmologists attempted to identify the risk factors and prevention methods to avoid such severe complication of this technique. Since post-LASIK ectasia occurs with higher prevalence when compared to photorefractive keratectomy (PRK), the less invasive surface ablation is generally considered as a safer approach that could be recommended occasionally in some “so called” suspected cornea^[1-2]. Thus, the post-PRK ectasia appears as a sporadic event reported rarely in the scientific literature.

Patient 1 A 23-year-old man underwent refractive surgery for myopia in October 2005 in both eyes. His preoperative refraction was sphere -6.25 diopters in the right eye and sphere -6.00 diopters in the left eye. The best-corrected visual acuity (BCVA) was 20/20 in both eyes. Central keratometry was 44.08/44.95 diopters in the right eye, and 43.25/44.25 diopters in the left eye, with the CCT of 560 µm in the right eye and 555 µm in the left eye. The corneal topography showed a regular pattern in both eyes. The PRK was performed with Mel 70 G-scan excimer laser (Carl Zeiss Jena, Germany) with ablation zone diameter of 6.8 mm in the right eye and 6.5 mm in the left eye. Central ablation depth was 104 µm in the right eye and 92 µm in the left eye. Until 6mo after surgery, uncorrected visual acuity (UCVA) was 20/20 on both eyes. In October 2006, 1y after PRK, the patient had a myopic regression of sphere -1.00 diopter and underwent an enhancement in his left eye with ablation zone of 6.5 mm and ablation depth of 15 µm. Preoperative topography showed regular central flattening in both eyes resulting from the previous treatment with no suspected features in both eyes (Figure 1). Refractive status was stable for three years, when the patient complained a loss of UCVA in his left eye with UCVA of 20/40 and BCVA

of 20/25, with sphere -1.50 and cylinder -2.00 axis 150. The slit-lamp examination showed a localized paracentral corneal thinning. The posterior maps were not available in our clinic at that time and the corneal placido-based topography showed a paracentral corneal ectasia with central keratometry of 43.09/46.82 and CCT of 461 µm (Figure 2).

Patient 2 A 54-year-old man was referred to our clinic for progressive decrease in his visual acuity. He underwent successful PRK in both eyes 10y earlier in the other refractive surgery center and his preoperative values were unavailable. His family history was negative for ocular diseases, including keratoconus, but he reported to be suffering from obesity, high blood pressure and Hashimoto's thyroiditis in medical therapy with levothyroxine. On ophthalmological examination, UCVA was 20/30 in the right eye and 20/20 in the left eye. Manifest refraction was sphere -3.00, cylinder -1.00 axis 150 in the right eye resulting in BCVA of 20/20, while no correction was requested in the left eye. Central keratometry was 41.75/42.75 in the right eye, and 39.28/39.74 in the left eye, with CCT of 601 µm in the right eye and 550 µm in the left eye. Corneal topography showed a regular and symmetric oblate pattern resulting from the previous refractive procedure (Figure 3). On February 2015, the patient complained a decreased visual acuity in the left eye lasting from about 3mo. His UCVA was 20/25 in the left eye. The BCVA was 20/20 with cylinder -1.25 axis 100 in the left eye. Central keratometry was 39.1/41.2 in the left eye, with CCT of 508 µm in the left eye. Corneal topography showed central corneal ectasia in the left eye confirmed by Belin-Ambrosio analysis (Figures 4, 5). The patient reported an important weight loss about 22 kg following a bariatric surgery, immediately before the visual disturbance onset.

DISCUSSION

Proper screening for cases at high risk and susceptibility for biomechanical failure and ectasia development after excimer laser surgery still represents a challenge for refractive surgeons. In the international literature related to the post PRK keratectasia, its incidence is rather low^[3-8], and it may run from some months to several years after the treatment, in relation to the procedure^[9-11]. Several ectasia cases have had abnormal preoperative topographies, the patients were significantly younger, with higher myopia, they exhibited thinner corneas before surgery and enhancements were reported in a majority of cases^[12-13]. Our first case report developed ectasia after retreatment. Thus, it might confirm that any retreatment, even in total absence of profile and CCT alterations in young subjects could constitute a potential risk factor for ectasia development after PRK. This case highlights the need for caution and

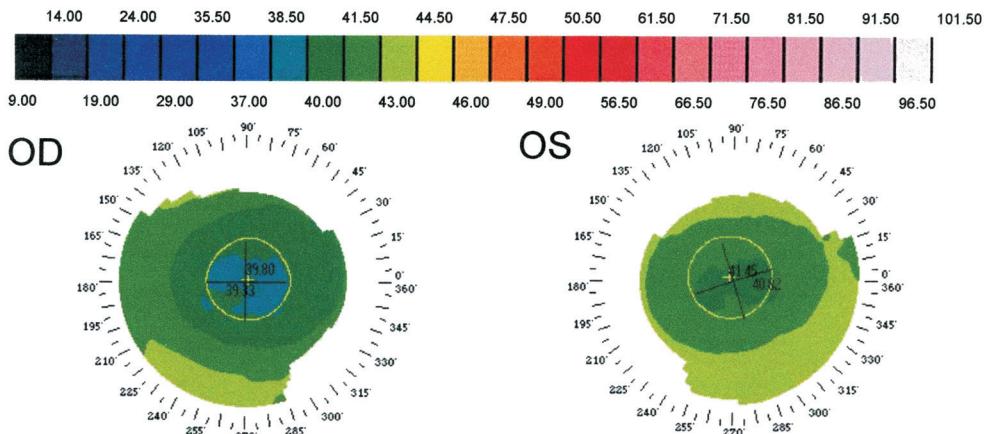


Figure 1 Right and left eye after PRK and before the left eye retreatment.

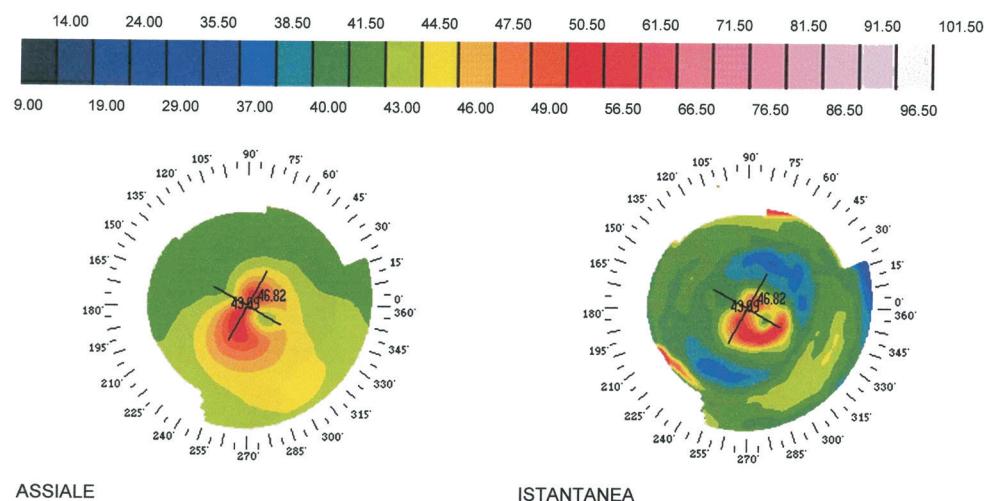


Figure 2 Central ectasia with irregular astigmatism after myopic enhancement in the left eye.

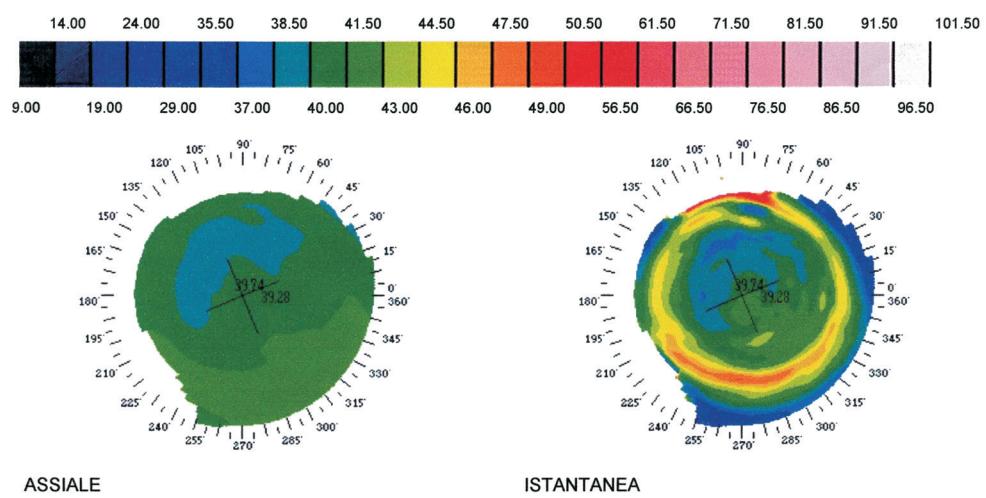


Figure 3 Corneal topography of patient 2, as he came to our observation.

appropriate informed consent for any patient undergoing corneal refractive surgery retreatment.

The potential role of the metabolic condition and the onset of corneal ectasia were not investigated until now. We think that metabolic changes could be considered as an additional factor in some cases, as suggested by case 2, that was stable for almost 20y after PRK, and developed ectasia together to a significant weight loss followed the bariatric surgery and

changes in his metabolic condition. It could be suggestive for the corneal biomechanical changes resulting from metabolic stress, but such hypothesis needs further investigation. In this report, we wish to highlight the observed coincidence, and invite the refractive surgeons to investigate metabolic status of the patients who develop post-refractive surgery corneal ectasia. Therefore, further studies are necessary to standardize the risk of developing ectasia and select more accurately patients who can safely undergo a PRK.

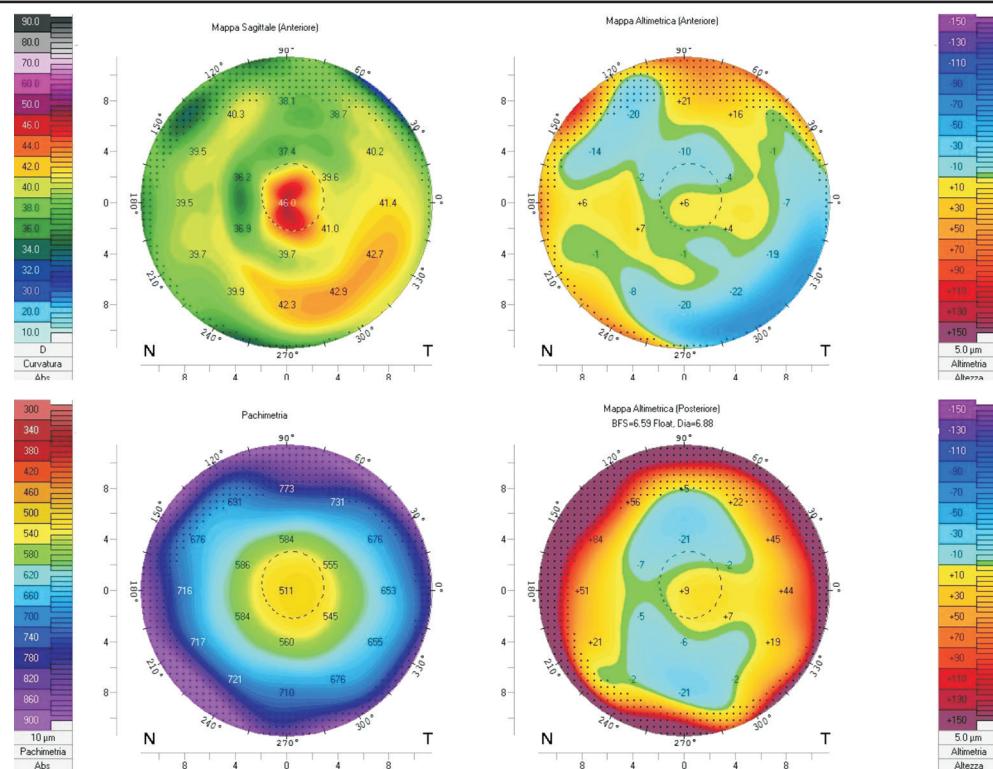


Figure 4 Central corneal ectasia in the left eye seventeen years after myopic PRK.

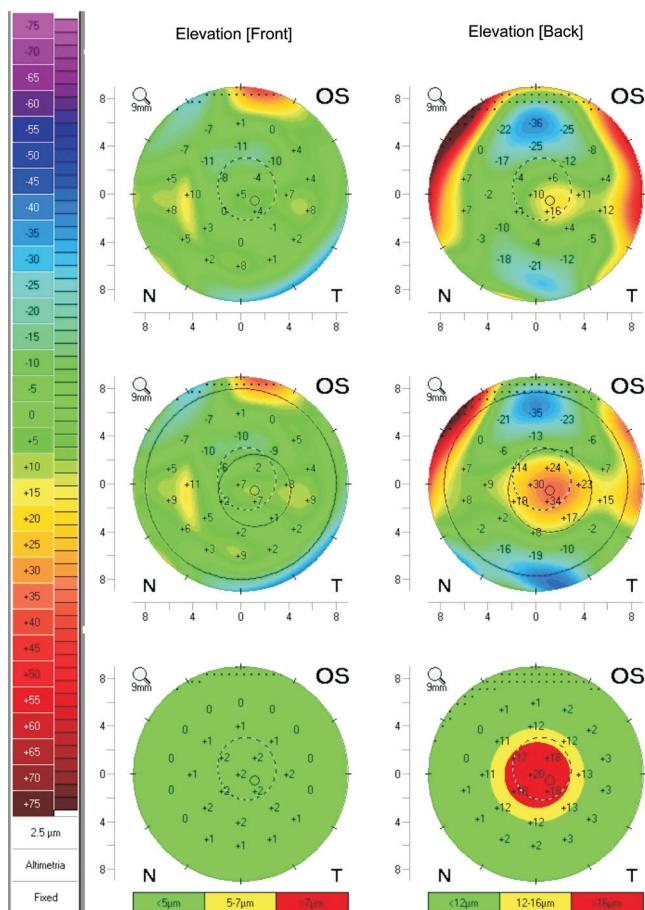


Figure 5 Belin-Ambrosio enhanced ectasia display confirming ectatic corneal pattern.

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