INTERMITTENT PAIN AND BLUR AFTER PRK

This patient was told nothing could be done about a nodular, keloid-type subepithelial scar.

BY ABI TENEN, MBBS (HONS), FRANZCO; ANDREA ANG, MBBS (HONS), MPH, FRANZCO; DENA BALLOUZ, MD; PARAG A. MAJMUDAR, MD; ALLON BARSAM, MA(CANTAB), MBBS, FRCOPHTH, FWCRS; AND MARGUERITE B. MCDONALD, MD, FACS

CASE PRESENTATION

A 36-year-old woman presents with pain, blurred vision, and foreign body sensation in her left eye. Eight years ago, she underwent bilateral PRK for myopia and high astigmatism by another surgeon. The patient has experienced these symptoms intermittently since the surgery, and they have neither improved nor worsened. She was told that the left cornea has a scar and that nothing further can be done.

On examination, the patient's UCVA is 6/7.5+2 OD, 6/9.5+2 OS, and 6/6 with both eyes open. Her manifest refraction is 0 -0.75 x 50° = 6/6 OD and -0.25 -1.25 x 20° = 6/6 OS. The IOP is 10 mm Hg OD and 12 mm Hg OS. A slit-lamp examination of the left eye finds a nodular, keloid-type subepithelial scar with surrounding haze in the paracentral cornea. A reactive ptosis and brow overaction are also present on the left. The right cornea exhibits mild central haze.

Anterior segment OCT (AS-OCT) of the left eye demonstrates an elevated area inferonasal to the central cornea (Figure 1). Cross-sectional views reveal a lesion height of approximately 220 µm (Figure 2). There is no overlying epithelial defect, and an intraocular examination is unremarkable.

The patient has been administering topical fluorometholone drops prescribed by her optometrist several times a year for 2 weeks at a time as well as ocular lubricants. The ocular pain is often sharp. The patient is distressed about her situation and requests a second opinion.

– Case presented by Abi Tenen, MBBS (Hons), FRANZCO

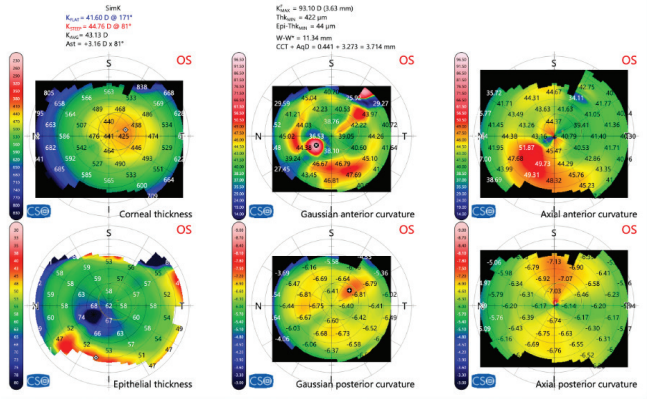

Figure 1. AS-OCT corneal mapping (MS-39, CSO Italia) of the left eye.

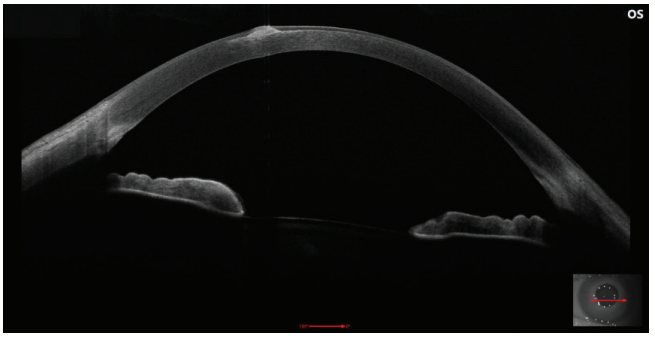

Figure 2. AS-OCT section of the same eye.

ANDREA ANG, MBBS (HONS), MPH, FRANZCO

The corneal keloid scar likely represents Salzmann-like nodular degeneration. Subepithelial nodules are frequently associated with tear film dysfunction. The elevated lesion disrupts the tear film, causing foreign body sensation and sharp pain. Chronic surface inflammation may also contribute to the development of fibrous hyperplasia. The nodule induces irregular astigmatism and flattening in the affected axis, which would explain the patient's blurred vision.

AS-OCT shows a discrete, elevated subepithelial/anterior stromal lesion, consistent with a superficial fibrotic process. Corneal tomography shows significant anterior surface irregularity with localized paracentral steepening at the nodular lesion.

The first step would be to optimize the patient's tear film. Her optometrist has already initiated treatment with lubricants and intermittent fluorometholone drops. Given the patient's persistent symptoms and reduced vision, I would offer a superficial keratectomy with adjunctive

mitomycin C (MMC) to reduce the risk of recurrent scarring. In addition, phototherapeutic keratectomy (PTK) could be considered to smooth the anterior stromal surface and remove any residual anterior stromal haze.

I would counsel the patient that epithelial remodeling and refractive stabilization may take 3 to 6 months. Ongoing tear film optimization would be essential both for symptom control and to help prevent recurrence. After removal of the nodule, I would expect her astigmatism and associated blurred vision to resolve. If, however, a significant refractive error persists, depending on her subjective binocular vision, she might benefit from wearing glasses or a soft contact lens on that eye. I would be cautious with repeat PRK because of an increased risk of recurrence of the nodule.


DENA BALLOUZ, MD, AND PARAG A. MAJMUDAR, MD

This symptomatic unilateral nodular subepithelial scar is consistent with a post-PRK corneal keloid–type lesion and is causing an astigmatic shift. Importantly, the patient's BCVA remains excellent in the left eye, so management would be guided by her symptoms rather than the lesion's appearance.

Tomography and AS-OCT support a localized subepithelial/anterior stromal process. Anterior curvature maps show focal steepening corresponding to the elevated lesion without posterior elevation. Epithelial maps confirm epithelial thinning over the lesion, indicating surface irregularity rather than progressive biomechanical instability or ectasia.

The patient's intermittent sharp ocular pain is most consistent with irritation due to epithelial irregularity, potentially causing recurrent corneal erosions. Intermittent corticosteroid use is unlikely to have a meaningful effect on established fibrosis. Symptom-guided conservative management with surface optimization would be our preferred initial approach. First steps would focus on optimizing the ocular surface with preservative-free lubrication and immunomodulatory therapy. Although refraction improves her BCVA, a diagnostic scleral contact lens trial would be performed to determine whether her qualitative symptoms improve with surface regularization and corneal protection.

Surgical intervention could be considered if conservative management with a scleral contact lens and aggressive lubrication fails. A superficial keratectomy or PTK could reduce lesion height and improve surface smoothness. If this is a Salzmann-type nodule, there may be a readily identifiable plane of dissection that might leave a smoother corneal contour. Recurrence following the surgical removal of corneal keloids, however, has been well described, even with corneal transplantation.[1,2] Adjunctive MMC might reduce this risk.[3] The high rate of recurrence and her possible need for a keratoprosthesis in this situation would be explained to the patient.[2]

ALLON BARSAM, MA(CANTAB), MBBS, FRCOPHTH, FWCRS

The patient is experiencing a disordered wound-healing response in both eyes following bilateral PRK. The differential diagnosis includes corneal keloid and Salzmann nodular degeneration. Given the early postoperative onset and the thickened epithelial profile on AS-OCT, a corneal keloid is more likely, although the presentation is relatively mild.

I would counsel the patient that the goal of further surgery would be to improve her comfort and corneal regularity and explain that the keloid might recur. The BCVA in her left eye remains good. I would emphasize that her refraction is likely to change after surgery and that she may require additional refractive correction to achieve spectacle independence.

Preoperatively, the ocular surface would be optimized, and the meibomian gland dysfunction would be treated. Postoperatively, low-dose topical steroids and topical cyclosporine would be prescribed.

My preferred approach would be a superficial keratectomy, combined with a limited PTK and intraoperative MMC (at a concentration of 0.02% and applied for 60 seconds) if necessary. Initially, I would attempt careful manual peeling of the lesion, which appears to be well demarcated on OCT. If peeling proves impossible, I would perform a meticulous lamellar dissection to debulk the lesion and restore a smooth contour. PTK (maximum programmed depth of approximately 50 µm) would be used conservatively and only if absolutely necessary, with balanced salt solution masking, primarily to smooth residual irregularity rather than for full tissue removal. If the lesion peels cleanly, laser treatment might be unnecessary.

After the cornea stabilizes, any residual refractive error would be addressed with a phakic IOL (Visian ICL, STAAR Surgical) rather than further corneal surgery.

MARGUERITE B. MCDONALD, MD, FACS

I would ask the patient if she has a history of keloids, and I would examine

any scars on her skin for possible keloid formation. Some individuals with a propensity for forming keloids are unaware that their healing pattern is abnormal.

The scar is so elevated that it rises above the tear film and is becoming desiccated. This is the cause of the patient's discomfort.

I would attempt manual removal of the scar using a 57 blade, followed by burring. The scar is shaped like a gum drop and is therefore not suitable for localized laser PTK. If she has a history of keloid formation, a sponge would be soaked in MMC 0.02%, squeezed dry, and then applied directly to the excision site for 15 seconds. Thereafter, the site would be rinsed with copious amounts of balanced salt solution.

Topical steroids would be prescribed postoperatively, and the patient would be closely observed.

WHAT I DID: ABI TENEN, MBBS (HONS), FRANZCO

After discussing various treatment options with the patient, I recommended manual debridement with PTK and an extended application of MMC in the left eye. I emphasized that the prognosis regarding her refractive outcome was guarded and that a second procedure might be necessary.

After epithelial debridement with 20% alcohol and limited manual debridement, PTK with a 10-mm radius and a depth of 10 µm was performed using the Schwind Amaris 1050 (Schwind eye-tech-solutions). MMC was applied with a sponge for 45 seconds.

After surgery, the patient was administered a low dose of oral prednisolone for 5 days in addition to a routine post-PTK regimen. The cornea healed without concern. At 1 week, her ocular discomfort had resolved, and the corneal contour was significantly smoother.

Four months after surgery, her UCVA was 6/7.5+2 OS, and her manifest refraction was -0.25 -0.5 x 25° = 6/6+1 OS. The patient was tapering the fluorometholone drops, and her eye was comfortable. A clinical examination and AS-OCT revealed a reduced area of scarring (Figure 3).

At her last visit, approximately 6 months after surgery, the cornea was stable, and the patient was happy with her outcome. ■

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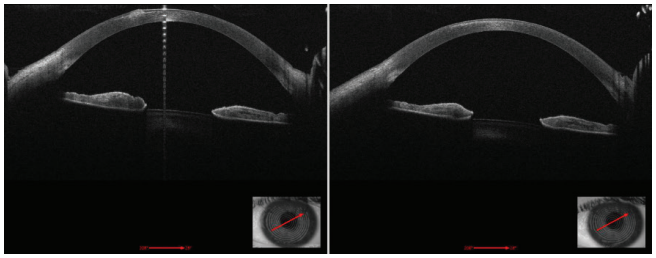

Figure 3. AS-OCT section comparing the pre- and postoperative appearance of the nodular scar in the left eye.

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