

Surgeons Helping Surgeons

A discussion among colleagues yields valuable insights in a challenging case.

**BY FRANÇOIS HAUSTRATE, MD; JÉRÔME C. VRYGHEM, MD;
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AND MICHAEL ASSOULINE, MD, PhD**

In December 2012, François Haustrate, MD, sent an e-mail to his colleague Jérôme C. Vryghem, MD, concerning a challenging case he had encountered and seeking Dr. Vryghem's insight. In turn, Dr. Vryghem forwarded the e-mail to several more colleagues, opening the discussion to a range of refractive surgeons from all over the world. As evidenced by their e-mail chain, reproduced below with the permission of the discussants, the varied surgical experiences and perspectives within the ophthalmic community can serve as excellent resources for decision-making in refractive surgery.

From: François Haustrate <f.haustrate@sharper-image.be>
Date: Sunday, December 2, 2012
To: Jérôme C. Vryghem <info@vryghem.be>
Subject: Ask for your advice on patient X

Dear Jérôme,

After our discussion last Friday, please find enclosed some data concerning patient X, date of birth May 24, 1989. She was treated on October 9, 2012, for a bilateral femto LASIK (refraction of -3.00 -1.75 X 0). The procedure on the patient's right eye was uneventful. Because the femtosecond laser cut (110 µm; 500-kHz VisuMax [Carl Zeiss Meditec]) on the left eye seemed decentered nasally and she has large scotopic pupils, I did not proceed on the left eye, did not lift the flap, and postponed the treatment. She was retreated on October 16, 2012, with a well-centered flap (VisuMax; 8.80 mm diameter with a depth of 140 µm). The lifting of the flap and the excimer laser treatment (Technolas tissue-saving profile, 7-mm optical zone) for -3.00 -1.50 X 180 were performed uneventfully.

At day 1, the patient showed irregular astigmatism with a fold in the temporal inferior sector of the flap, running from the flap edge up to the prepupillary zone. I relifted the flap on October 22, 2012, in order to rinse the interface, but she still ended up with irregular astigmatism. At the slit lamp (my camera is out of order

and I therefore cannot show you an image), there is still a small intrastromal line visible in the temporal inferior interface, which tends to fade away prepupillary. The UCVA is 0.3. No correction can really improve the vision. I suppose that there must be a partial shift of a lenticule of 30 µm underneath the 140-µm flap [ie, as a result of the original abandoned cut]. Can you or some of your colleagues/experts suggest any ideas to treat this case?

Thank you in advance for your helpful suggestions.
Sincerely,
François Haustrate

From: Jérôme C. Vryghem <info@vryghem.be>
Date: Monday, December 10, 2012
To: Sheraz Daya <sdaya@centreforsight.com>, Arthur Cummings <abc@wellingtoneyeclinic.com>, Michael Assouline <dr.assouline@gmail.com>, François Haustrate <f.haustrate@sharper-image.be>, Jerry Tan <jtaneyes@singnet.com.sg>
Subject: Re: Ask for your advice on patient X

Dear friends,

May I ask you a bit of your time to have a look at François' case. What would you do?

Best regards,
Jérôme

From: Jerry Tan <jtaneyes@singnet.com.sg>
Date: Monday, December 10, 2012
To: Jérôme C. Vryghem <info@vryghem.be>, Sheraz Daya <sdaya@centreforsight.com>, Arthur Cummings <abc@wellingtoneyeclinic.com> Michael Assouline <dr.assouline@gmail.com>, François Haustrate <f.haustrate@sharper-image.be>
Subject: Re: Ask for your advice on patient X

Dear Jérôme,

I suspect there was a double cut with the femtosecond laser, and there was loss or displacement of tissue under the flap. This resulted in irregular astigmatism. I would wait at least 6 months (the longer the better) and do a corneal wavefront-guided or topography-guided transepithelial PRK with a lot of mitomycin C for at least 1 minute. I would not promise the patient refractive accuracy and would explain to her that it will be done in two steps, although, of course, you will try to do it in one step (under-promise and over-deliver).

With the transepithelial PRK and corneal wavefront-guided treatment, I would go to the treatment planner and switch off spherical aberration correction. The depth of ablation will be compared with the aberration-free treatment, and if it is about 10 µm more compared with the aberration-free treatment, I would go ahead and treat it using a 6.5-mm optical zone. It will take at least a month for visual stability. This is what I would do.

Best wishes,
 Jerry Tan

From: Arthur Cummings <abc@wellingtoneyeclinic.com>
Sent: Monday, December 10, 2012
To: Jérôme C. Vryghem <info@vryghem.be>; Sheraz M. Daya <sdaya@centreforsight.com>; Michael Assouline <dr.assouline@gmail.com>; Jerry Tan <jtaneyes@singnet.com.sg>; François Haustrate <f.haustrate@sharper-image.be>
Subject: Re: Ask for your advice on patient X

Hi Jérôme,

This is a tricky enough case, and I think I would tend to agree with Jerry. Wait at least 6 months, and do whatever you need to do in the future with a surface ablation with mitomycin C. I would probably do it topography-guided (depending on what you find then) with a possible wavefront-guided surface treatment 6 months later, again as required. Obviously there is a possibility that you get the refraction nailed down with your first surface procedure. You may also, depending on how it heals, be able to do the first treatment as a wavefront-guided treatment, pending the quality of the wavefront maps.

The alternative is to lift the flap, but this is fraught with dangers: How do you know which flap you have? If you do find the sliver of corneal tissue, how do you deal with it?

Everything considered, I would go with the above approach until I see a better suggestion from one of my esteemed colleagues. In the meanwhile, if she needs visual rehabilitation I would consider a rigid gas-permeable (RGP) contact lens.

Kind regards,
 Arthur

From: Sheraz Daya <sdaya@centreforsight.com>
Date: Tuesday, December 11, 2012
To: Jerry Tan <jtaneyes@singnet.com.sg>, Jérôme C. Vryghem <info@vryghem.be>, Arthur Cummings <abc@wellingtoneyeclinic.com>, Michael Assouline <dr.assouline@gmail.com>, François Haustrate <f.haustrate@sharper-image.be>
Subject: Re: Ask for your advice on patient X

Complicated. Did François encounter a sliver of tissue during the procedure or flap lift to correct the fold? Three months on makes things more complicated, and, from previous experience, retaining slivers causes more trouble than they are worth. I would consider lifting and removing the sliver. Suture back the flap to ensure there are no folds. In time, anticipating an over-correction, however, hopefully with more regular astigmatism, I would perform a wavefront LASIK to correct the refractive error.

Jerry's option of waiting is not a bad one at this stage. I have found that, with this level of irregularity, epithelial modeling just does not do the job. Also, when it comes to correcting with a surface treatment, the epithelial modeling is removed, and you are back at square one in terms of irregular astigmatism. If you use mitomycin C, you might not get the epithelium remodeling back in the same way. Worst-case scenario, if all else fails (and I have recently had to do this on a case from St. Elsewheres), is a flap replacement. Not an easy case—will be interesting to hear what happens.

Regards,
 Sheraz

From: Michael Assouline <dr.assouline@gmail.com>
Date: Tuesday, December 11, 2012
To: Sheraz Daya <sdaya@centreforsight.com>, Jerry Tan <jtaneyes@singnet.com.sg>, Jérôme C. Vryghem <info@vryghem.be>, Arthur Cummings <abc@wellingtoneyeclinic.com>, François Haustrate <f.haustrate@sharper-image.be>
Subject: Re: Ask for your advice on patient X

I have read with great interest what my good friends

Arthur, Sheraz, and Jerry had to say. I believe that, in corneal complications of refractive surgery or trauma, what you think (about what happened) and what you see (at the slit lamp) do not always explain the true cause of the impaired or limited vision. Most often, visible opacities that reflect light from the slit lamp are not so much functionally important as is the irregularity of shape they are associated with. A typical example is that of florid geographic basal lamina dystrophy, which sometimes seems dreadful at the slit lamp on top of a LASIK flap but has little or no impact on vision.

As a consequence, I tend to deal with cases like this solely on the objective clues that I can gather, including: (1) visual acuity that is independent from irregular astigmatism with a stenopeic hole or slit or with an RGP contact lens, and near visual acuity; (2) slit lamp retroillumination photos (that can be taken with the iPhone 5 after removing the slit-lamp eyepiece) or a skiascopic image (from the refractometer); (3) video-keratoscopy or, even better, images of Placido rings deformed by folds; (4) Pentacam [Oculus Optikgeräte GmbH], Orbscan [Bausch + Lomb], or, even better, TMS-5 topography [Tomey] showing the amount of irregular astigmatism; (5) Zywave aberrometry [Bausch + Lomb]; (6) Optical Quality Analysis System [Visiometrics] aberrometry and polarimetry; and (7) corneal profile biometry (flap thickness and relationship between flaps) and densitometry on the Visante OCT [Carl Zeiss Meditec] or equivalent.

In this specific case, it is not yet clear whether any of the following factors (or combination of factors) are significantly contributing to the limitation of vision: (1) lack of cooperation from a dissatisfied patient when measuring the visual acuity (malingering); (2) ocular dryness; (3) flap folds from flap displacement; (4) irregular surface shape from the decentration of the first flap; (5) shift of a stromal sliver within the interface inducing flap folds; (6) unaccounted loss of stromal substance from the recut; or (7) irregular or decentered ablation. Other causes must also be ruled out to concentrate on the corneal findings (including problems related to the lens, retina, and optic nerve).

If the corneal irregularity issue cannot be solved at once by simple means (such as stretching the flap, realigning a sliver, and retreatment of a decentered ablation), buying time with an RGP lens is always a safe option that efficiently relieves some pressure from the anxious patient and surgeon. Within 1 to 5 years, stromal and epithelial remodeling may contribute to a much improved corneal surface and transparency, thus providing a more acceptable visual outcome, provided

the patient and doctor can cope with the frustration of the long waiting time. Shortcuts to this natural history are possible, including sequential topography-guided then wavefront-guided surface ablation (with mitomycin C) or interface ablation; however, the refractive and visual outcomes cannot be guaranteed, and additional complications cannot be excluded. I will be happy to be informed of the development of this case.

Best regards to all,
Michael

From: Arthur Cummings <abc@wellingtoneyeclinic.com>

Date: Tuesday, December 11, 2012

To: Sheraz Daya <sdaya@centreforsight.com>, Jerry Tan <jtaneyes@singnet.com.sg>, Jérôme C. Vryghem <info@vryghem.be>, Michael Assouline <dr.assouline@gmail.com>, François Haustrate <f.haustrate@sharper-image.be>

Subject: Re: Ask for your advice on patient X

Well thought-out reply, Michael! As you say, time will hopefully be an ally here, and we're all keen to see what transpires in terms of the treatment option and the outcome.

Regards,
Arthur

From: Jerry Tan <jtaneyes@singnet.com.sg>

Date: Wednesday, December 12, 2012

To: Arthur Cummings <abc@wellingtoneyeclinic.com>, Sheraz Daya <sdaya@centreforsight.com>, Jérôme C. Vryghem <info@vryghem.be>, Michael Assouline <dr.assouline@gmail.com>, François Haustrate <f.haustrate@sharper-image.be>

Subject: Re: Ask for your advice on patient X

Dear all,

Great to hear everybody's interest. Jérôme always comes out with the most bizarre cases, but it is good to learn that recutting with a femtosecond laser is not easy. I tend to recut with a microkeratome if I have failed with a femtosecond laser, which so far occurred only once because of a decentered flap in a big cornea. One of the reasons I do not like to put a patient on RGP lenses is that it changes the natural corneal contour, and it will take weeks for the cornea to return back to its natural state. This again takes time and is inconvenient for the patient. As her power was not very high (-3.00 with some astigmatism), if the patient could wear glasses and wait 6 months or lon-

TAKE-HOME MESSAGE

- The varied surgical experiences and perspectives within the ophthalmic community can serve as excellent resources for decision-making in refractive surgery.
- Discussion among colleagues may lead to new insight into the management of a particularly challenging case.

ger (patients usually run out of patience after about 6 months to 1 year), something really needs to be done.

My fear of lifting the flap again is that if you find the sliver of tissue, what do you with it? If you place it in the wrong place, it will cause another host of problems and change the corneal contour again. If you throw it away, you are losing valuable corneal thickness. This is something you cannot replace, so I think the best thing to do is to let the cornea heal as long as possible

In March 2013, Dr. Haustrate told *CRST Europe* that his chosen treatment plan for the present is to wait a couple of months and see how the situation evolves. The participants of this discussion invite *CRST Europe* readers to share their own management suggestions for this challenging case. ■

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depending on the patient's patience and then do a transepithelial PRK (transPRK—a Schwind eye-tech-solutions term). This way, you get a great corneal contour due to the epithelial compensation carried down from the surface.

I have been using transPRK more and more for difficult cases with better and better results. I even use it for keratoconus patients, for whom I am doing corneal topography-guided treatments before crosslinking. This way, I do not have any worries about thinning of the epithelium over the cone or thickening of the epithelium around the cone. The best thing about the Schwind system is that they have worked out a fantastic algorithm for transPRK, which is very accurate beyond 1.00 D of correction. I could never see the disappearance of the blue light when there was epithelial breakthrough in the WaveLight. Maybe it is because my lenses in my eye are getting cataractous and yellow. :-)

These are my additional thoughts.

Wishing everyone a Merry Christmas and a Happy New Year!

Best wishes,
Jerry Tan

Arthur B. Cummings, MB ChB, FCS(SA), MMed(Ophth), FRCS(Edin), is a Consultant Ophthalmologist with the Wellington Eye Clinic in Dublin, Ireland. Dr. Cummings is a consultant to Alcon/WaveLight and an Associate Chief Medical Editor of CRST Europe. He may be reached at e-mail: abc@wellingtoneyeclinic.com.



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