

TABLE 10-2

Incidence of Lenticule Remnants in SMILE for a 4,000-Eye Population

LENTICULE REMNANT	COUNT	INCIDENCE
Lenticule remnant retrieved	7	0.18%
Lenticule remnant left in the eye (not visually significant)	7	0.18%
Lenticule remnant left in the eye (visually significant)	0	0.00%
Lenticule remnant—all	14	0.35%

taken during surgery to ensure that the entire lenticule has been removed, particularly as retrieving lenticule remnants is much easier intraoperatively than a few days, weeks or months after surgery.

In a retrospective analysis of our first 4,000 SMILE procedures, there were 14 (0.35%) instances of a lenticule remnant (Table 10-2). These were identified and dealt with intraoperatively in 50% of cases, while a small, non-visually significant lenticule remnant was left in the eye in the other 50%. The management of these cases is the subject of the following sections.

10.3.1. Retrieval of Lenticule Remnants During Surgery

The first step in the process of managing lenticule remnants is to identify when they occur. As described in Chapter 9.6, this is why we always check the integrity of the lenticule for every eye treated, by placing it on top of the cornea immediately after removal (Figure 10-16).

If the lenticule is found to be incomplete, there are a few techniques that can be used to help locate the residual piece:

- The circumference of the lenticule border can be evaluated using the Separator bulb, and the remnant may be large and obvious enough to be found simply by the feel of the instrument, akin to finding the end on a reel of sticky tape.
- Lifting the instrument to raise the cap away from the stromal bed creates an air pocket that improves visibility of the stromal bed to identify the border of any unseparated areas.
- The built-in slit-lamp feature within the operating microscope can be used to aid visualization of the edges of a lenticule remnant.
- Flooding the interface with a preservative-free opaque suspension (such as Kenalog-10 [triamcinolone acetonide, Bristol-Myers Squibb]) can be used

to demarcate the contours within the interface, so the location of a lenticule remnant is outlined by the white liquid pooling in the relative trough created by the abrupt change in curvature at the edge of the remnant.

Once the location of the lenticule remnant has been identified, it can sometimes be separated using the Separator bulb as for a normal lenticule, although an instrument with a sharper tip is often required given that this was an area that was unseparated by the Separator bulb in the first instance. In other cases where there is a thin strip remaining in situ, forceps can be used to circumferentially tear the strip of lenticule away from the border in a lenticulerhexis-type technique.

Having removed the lenticule remnant, this should ideally be placed on the cornea together with the main body of the lenticule to check that the pieces of the puzzle fit together and confirm that the entire lenticule has now been extracted. As before, by doing this on the cornea, the final lenticule is captured as part of the VisuMax video recording (Chapter 9.6). If the pieces do not fit perfectly, then further investigation of the interface might be performed. The final lenticule can also be recorded with fluorescein staining after surgery (Figure 10-17).

10.3.2. Retrieval of Lenticule Remnants Using the Separator Bulb

The first example (Video 10-C1) is of a 48-year-old female patient with a manifest refraction of $-2.00 -1.50 \times 15$ (20/16⁻²). The femtosecond cutting appeared routine with a perfectly regular bubble pattern and no significant opaque bubble layer (OBL) (Figure 10-18). The cap interface was separated in a single circumferential sweep, indicating that separation resistance was