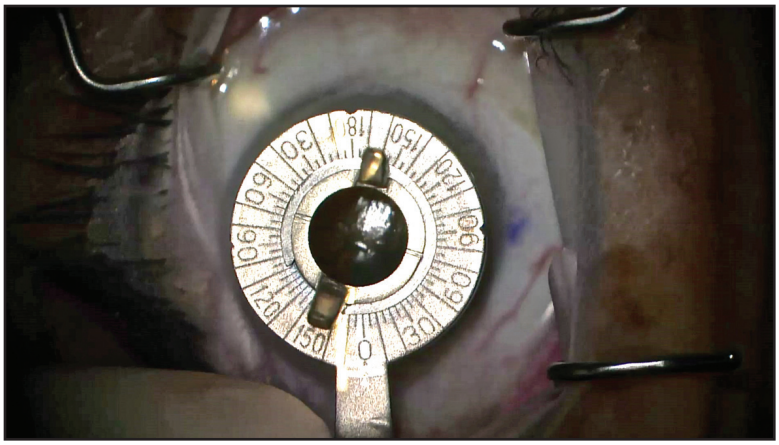

Figure 32-2. A toric marker is pressed against the cornea. The 90-degree meridian on the toric marker aligns with the 6 o'clock limbal reference. The steep postoperative corneal meridian will be 70 degrees in this example.

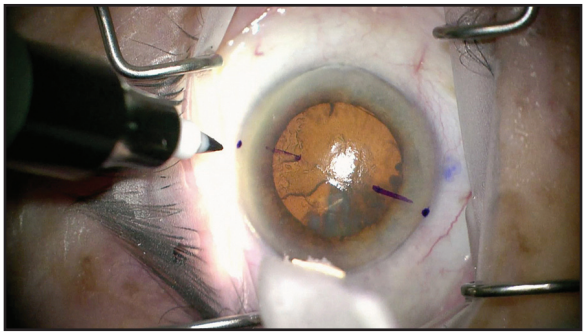

Figure 32-3. After marking the steep postoperative corneal meridian, longer lasting limbal reference marks are placed. Their locations can be adjusted if there was any problem centering the toric marks on the cornea.

Future Methods

It is possible to perform toric IOL implantation without marking the eye at all. The SensoMotoric Instruments surgery guidance system (SMI) produces keratometry readings that are locked to a photograph that contains vessel and other registration landmarks. Because the keratometry readings are locked to the photograph, it is not so critical that the patient's head be positioned perfectly straight in front of the topographer when the keratometry readings are obtained (Figure 32-4). This technology was recently acquired by Alcon Laboratories and will be marketed as the Varion system.

In the operating room, the digital photograph is registered with the live eye. Using an eye tracker and a heads down digital overlay within the operating microscope, a digital steep meridian mark can be placed over the eye that tracks with eye movements. The two marks on the toric IOL are aligned with the digitally generated corneal steep meridian marker. All of this is done without placing a single ink on the eye (Figure 32-5).

Another technology that is gaining momentum is the WaveTec Vision Optiwave Refractive Analysis (ORA) system. This device is an intraoperative aberrometer that attaches to an operating microscope. It measures the refractive state of the eye in the aphakic or pseudophakic state, including sphere and cylinder, and can be used to adjust the axis of a toric IOL in real time. Its limitations are those of all other methods in that it cannot predict the effect of wound healing on final corneal astigmatism, nor the final IOL position after capsule bag contraction. Nevertheless, it is a promising technology.