

# Chapter 12

## Insertion of Intrastromal Corneal Ring Segments (ICRS), Femtosecond Laser Assisted



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### Indications

Patient with stable corneal ectasia (keratoconus, pellucid marginal degeneration, and post-LASIK ectasia), central corneal thickness  $> 400 \mu\text{m}$ , astigmatism  $< 7 \text{ D}$ , absence of central corneal leukoma, poor motivation to wear contact lenses, and/or contact lens intolerance. Based on preoperative visual limitations, not all patients benefit from this surgical procedure. Ideal candidates for ICRS insertion have corrected distance visual acuity (CDVA)  $< 0.4$  (in decimal scale) and a keratoconus classified grade III or higher on the Red Temática de Investigación Cooperativa en Salud (RETICS) scale.

### Essential Steps

1. Topical anesthetic and antibiotic drops are instilled into the eye.
2. Patient positioned under the femtosecond laser system.
3. Eyelid speculum placed (*optional*).
4. Docking of the applanation cone with the suction ring positioned on the eye, centered on the pupil.
5. Suction application.

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6. Femtosecond laser-assisted creation of a continuous curvilinear corneal tunnel with a corneal incision at 70–80% of minimum corneal thickness for 5–7 mm (Fig. 12.1a).
1. Patient transferred to the operating room.
  2. Eyelid speculum placed, and patient placed under the operating microscope.
  3. ICRS insertion through the incision into the tunnel with appropriate instruments (Fig. 12.1b–g).
  4. Topical antibiotic and steroid drops are instilled.
  5. Bandage contact lens placed (*optional*).

## Complications

- Corneal microperforation
- Segment decentration
- Inadequate depth of the tunnel
- Asymmetry of the segments
- Superficial tunnel dissection with anterior Bowman layer perforation when inserting the segment
- Corneal macroperforation
- Corneal edema
- Inflammation
- ICRS extrusion
- Corneal neovascularization
- Corneal haze
- ICRS migration
- Corneal melting
- Infectious keratitis
- Mild tunnel deposits around the segments
- Refractive failure

## Template Operative Dictation

**Preoperative diagnosis:** *Corneal ectasia (OD/OS)*

**Procedure:** Femtosecond laser-assisted insertion of intrastromal corneal ring segment (*OD/OS*)

**Postoperative diagnosis:** *Same*



**Indication:** This \_\_\_\_-year-old (*male/female*) with a well-known and documented history of (*pellucid marginal degeneration/post-LASIK ectasia/keratoconus*) who complained of decreased vision despite the use of (*spectacles/contact lenses*). The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

**Description of the procedure:** The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. Topical anesthesia and antibiotic drops were placed into the (*right/left*) eye. Once in the femtosecond laser room, the patient was placed in the supine position under the laser system. (*An eyelid speculum was placed.*) A proper time-out was performed verifying correct patient, procedure, site, and positioning. The laser cone was appanated onto the center of the cornea and was docked into the circumferential suction ring. Suction was applied evenly across the cornea. Following the docking procedure, the femtosecond laser was then used to create a continuous curvilinear corneal tunnel at 70–80% of the depth of the cornea with a corneal incision located at \_\_o'clock.

Once the procedure was completed, the patient was brought into the OR on an eye stretcher in the supine position. Topical anesthesia, 0.5% tetracaine, was instilled into the conjunctival fornices of the (*right/left*) eye. The (*right/left*) eye was prepped and draped in the usual sterile fashion. Another time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. The operating microscope was centered over the (*right/left*) eye, and an eyelid speculum was placed.

The corneal incision and the underlying edges of the tunnel were opened using a sinskey hook. The clockwise segment was fully inserted into the (*temporal/nasal*) part of the tunnel using the segment holders. The counterclockwise segment was then fully inserted into the (*temporal/nasal*) part of the tunnel symmetrically. Topical antibiotic and steroid were applied on the cornea. (*A bandage contact lens was placed on the cornea.*) The eyelid speculum and drape were removed. The patient tolerated the procedure well and left the operating room in good condition.

## Additional Resource

<http://eyetu.be/arofa>; <https://www.youtube.com/watch?v=4Iz3rfEPzDQ>.