How to avoid an unhappy patient after ISCRS implantation

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Intrastromal Corneal Rings: Myth Versus Reality

Still very controversial
Two extremes of physician attitude:

- “Doesn’t work!”
- Any keratoconus patient gets one (or two!)

The Truth
How do rings improve vision?

Steepen the periphery and flatten the center

Pre-op K's: 46.4/55.1 (50.1)

Post-op K's: 40.4/46.4 (43.4)

UCVA 20/400

UCVA 20/40

Surgeon: Dr. Sameh El-Agha
How do rings improve vision

Recentering a sagging cone

K1 54.4 D / K2 57.1 D
Mean K: 55.7 D

K1 52.7 D / K2 54.6 D
Mean K: 53.7 D

UCVA 20/600

UCVA 20/50

Surgeon: Dr. Sameh El-Agha

How do rings improve vision

K1 46.7 / K2 50.5
Km: 48.5 D

UCVA 20/400

K1 46.7 / K2 48.2
Km: 47.5 D

UCVA 20/40

Surgeon: Dr. Sameh El-Agha
Other mechanisms?

Reducing posterior elevation?

Who are the unhappy patients after ISCRS implantation

- The case was too advanced
- The case was too early
- Incorrect refraction
- Large pupil diameter
- Improper depth of tunnel
- Improper incision placement
- Rings not placed along visual axis
Who are the keratoconus patients who will benefit from intrastromal corneal rings

1. No apical scars
2. No stress lines (Vogts’ striae)
3. No Fleischer rings
4. No breaks in descemet’s membrane

THE CORNEA SHOULD LOOK ABSOLUTELY NORMAL AT THE SLITLAMP

These patients will definitely be unhappy after ISCRS implantation!
When are rings are unnecessary?

UCVA: 0.7 WITH EITHER EYE, 1.0 OU

Unhappy patient after ISCR

- Post-LASIK ectasia
- Pellucid-like picture: most of ectasia outside the 5mm zone
- Mean K: 41.6 D (FLAT!)
- Result after single ring segment implantation:
  - Subjectively: “No change in my vision”
  - Minimal change in topographic pattern
  - Mean K: 40.2 D (EVEN FLATTER!)
  - Post-op MRx: Plano/+3.50 160°
Case selection for intrastromal rings: visual parameters

- Poor UCVA (20/200 or less): Wow effect can be almost like LASIK
- BCVA at least 20/50 (or 20/80)
- Manifest cylinder > 3D

Tips regarding refraction of the keratoconus patient

- PURELY SUBJECTIVE
- Previous spectacles may be a good starting point
- Stenopaeic slit can be very helpful
- Get the steep axis from the topography
Beware of autorefractometer!

UCVA : 20/400 OU

MRx:
- OD: plano / -7.00 x 40 ° → 20/50
- OS: plano / -6.00 x 120 → 20/50

Note the amount of error in:-
- Magnitude of sphere and cylinder
- Spherical equivalent
- Axis of cylinder

Tips regarding refraction of the keratoconus patient

- Tell the patient, “I know that glasses are useless in your case, but I need to take some measurements to know the right rings for you”
- Use the trial frame to “stack” cylinder (the nomograms for the Kerarings go up to -8.00 cylinder)
Ring selection (Kerarings)

- Based on manifest refraction and type of cone
- Other types of nomograms:
  - Based on asphericity (Q-value)
  - Based on axis of vertical coma

Preoperative planning: KERARINGS

- Ectasia type 1: Nomogram A
- Ectasia type 2: Nomogram B
- Ectasia type 3: Nomogram C
Actual examples

How do we use the Nomogram?

- Ectasia Type 2
- We use Nomogram B
- Ref.: -3.25 DS/ -4.25 DC x 145°
- Steep meridian: 55°
- Two 160° rings, 150μ and 250μ
Mesopic pupil diameter

Role of corneal thickness in decision-making process

- Central corneal thickness is of no consequence
- Look at the corneal thickness in the 5-mm zone
Proper tunnel depth selection

Incision placement: topographic vs. refractive cylinder

Manifest refraction: plano/−6.00 x120
Patient expectations: how do you counsel the patient

Two things not to say:-
  ◦ “We are going to make it easier to fit you with a contact lens”
  ◦ “After surgery, your glasses will be thinner.”

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<thead>
<tr>
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<th>Pre-op</th>
<th>Post-op</th>
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<tbody>
<tr>
<td>UCVA</td>
<td>20/600</td>
<td>20/50</td>
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<tr>
<td>MRx</td>
<td>-1.50/-4.50 x 30°</td>
<td>-1.00/-2.50 x 30°</td>
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<tr>
<td>BSCVA</td>
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<td>20/30</td>
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<td>SE</td>
<td>-3.75</td>
<td>-2.25</td>
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How do you counsel the patient

The real benefit is improvement of UCVA

Another secondary benefit is improvement of BCVA (but most patients don’t care!)
Intraoperative considerations: Importance of Marking Visual Axis

Surgeon: Dr. Sameh El-Agha

Intra-operative considerations: Implant rings right side up!

Surgeon: Dr. Sameh El-Agha
Sum-up: how to avoid patient dissatisfaction

- Proper case selection
  - Not too mild, not too severe
- Proper pre-operative planning
  - Reliable subjective refraction
  - Proper selection of arc length and thickness of ring segments
  - Calculation of tunnel depth
  - Axis of incision
- Adjusting patient expectations
- Proper execution of surgery
  - Centering tunnels on visual axis
  - Proper orientation of rings (apex up)

Thank you for your kind attention