Complications of Kerarings Implantation by femtosecond laser

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The Future
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Introduction

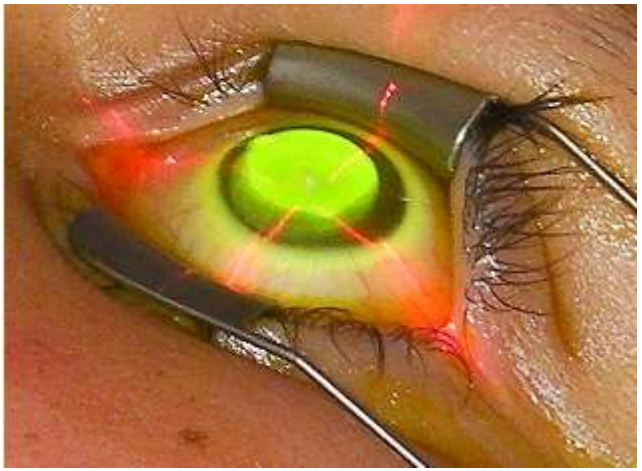
Keratoconus is a progressive, noninflammatory, bilateral (but usually asymmetric) ectatic corneal disease.

Introduction

Treatment modalities include

hard contact lens, corneal collagen crosslinking, Intracorneal ring segments

and Keratoplasty



Intracorneal Rings

Goals of Rings for Keratoconus

- To improve UCVA
- To improve BCVA
- To decrease HOA
- To increase Contact Lens Tolerance

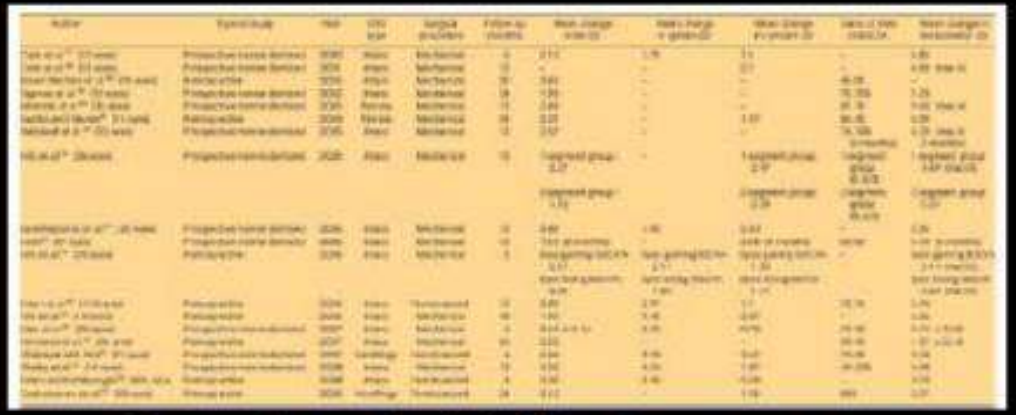
and Prevent the need for a Corneal Transplant

<u>However with Realistic expectations :</u>
Patients will still be dependant
on visual aids

What can be expected from Rings ?

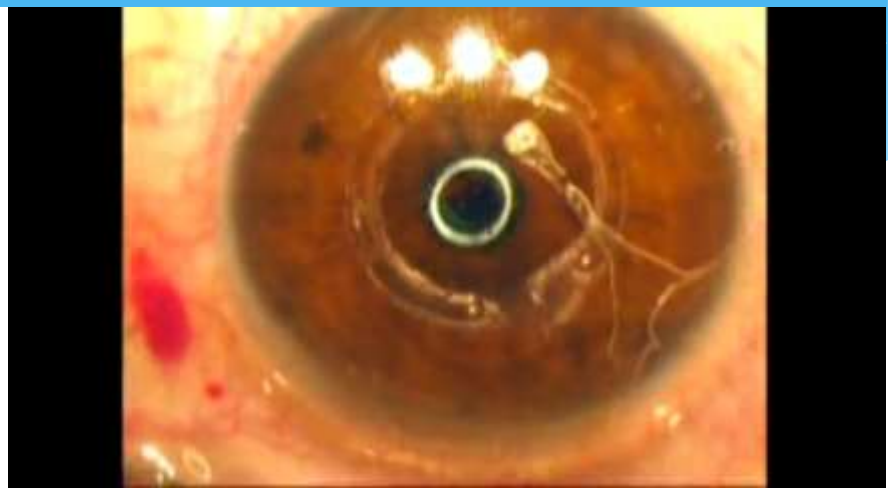
- SE Decreased by a mean of 1.45 to 3.46 D
- CYL Decreased by a mean of 0,24 to 2.88 D
- K readings Decreased by a mean of 1.57 to 5.59 D

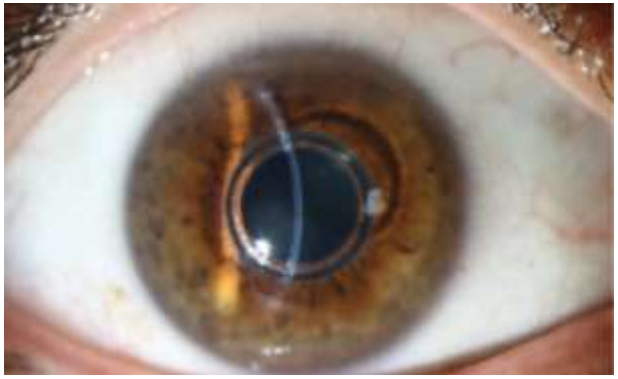
Based on the literature data, with more than 100 publications upon Rings' topic!



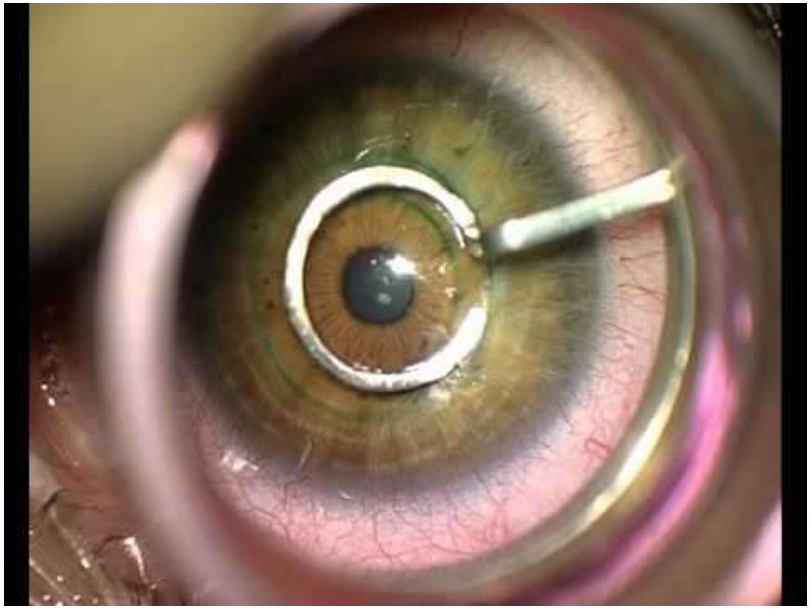
See meta-analysis in literature – Alió et al

Types of Rings





Methods of implantation of rings



Advantages of Femtosecond Tunnel Creation

- Precise Depth
- Precise Incision site creation
- Easier than manual
- Avoid complications of manual tunnel creation e,g: Anterior or Posterior corneal perforations , epithelial defects, infectious keratitis, asymmetric segment placement, corneal stromal oedema around the incision, extension of the incision towards the central visual axis or the limbus and persistent incisional gapping

Our Experience in Sohag Femto center

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مركز

After this period of intracorneal rings implantation

Even with femto tunnel creation complications can occur

Complications had been reported

Complications which reported classified into :

1) Intraoperative complications

A- Incomplete tunnel creation

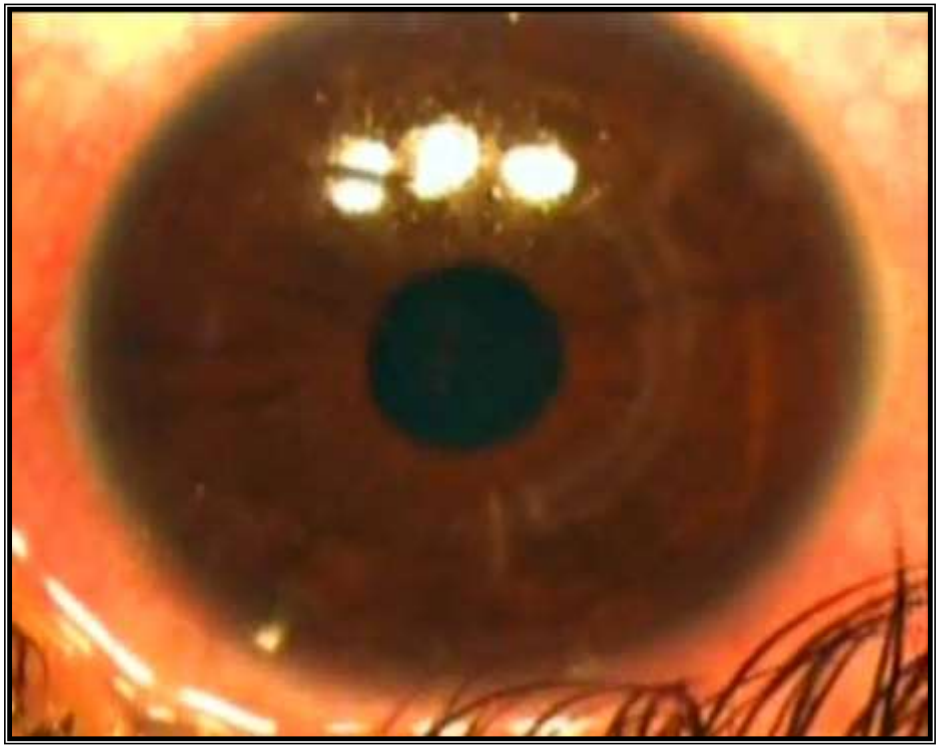
B- Decentered created tunnel

2) Postoperative complications

A-Migration B-Extrusion C- Infection

D- Crystalline deposits E- Sterile keratitis

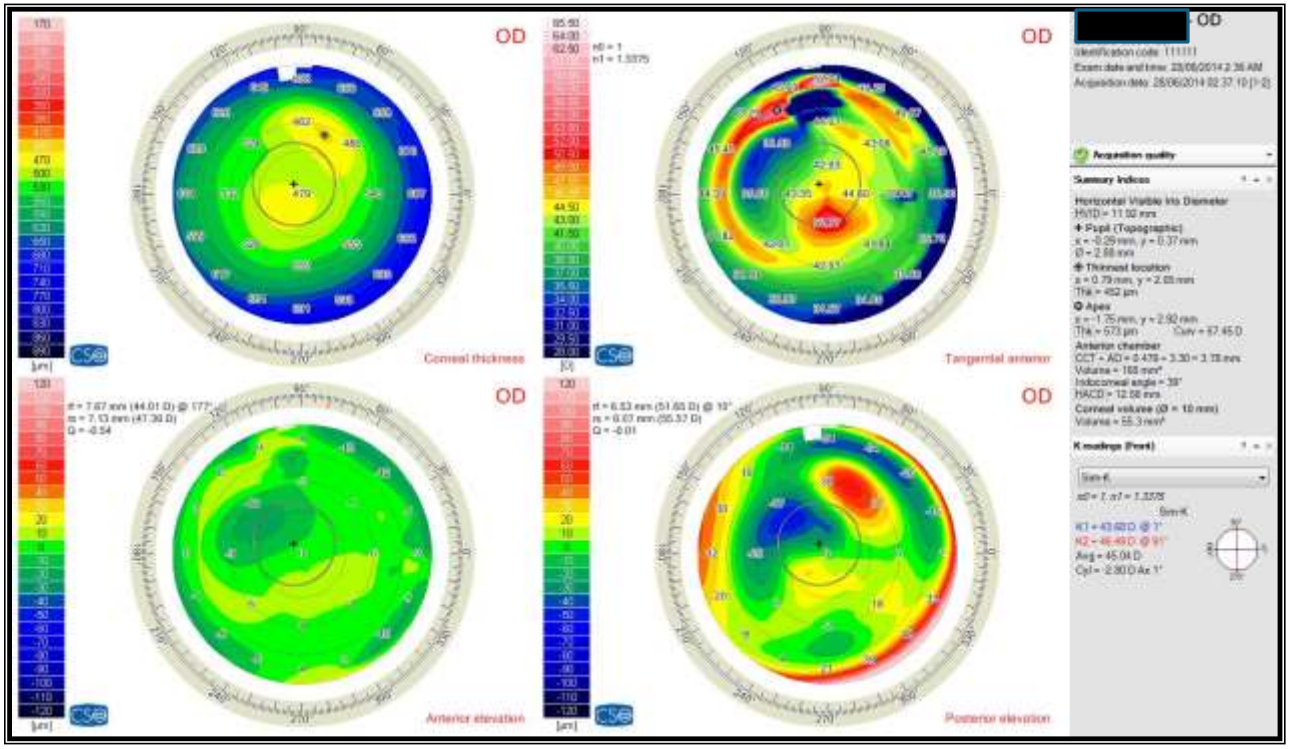
Incomplete tunnel creation



- Incomplete tunnel formation mainly occurs due to incomplete distribution of femto laser bubbles so the tunnel not created at one side
- Causes : 1- inadequate docking

2- Slight movement of patient head

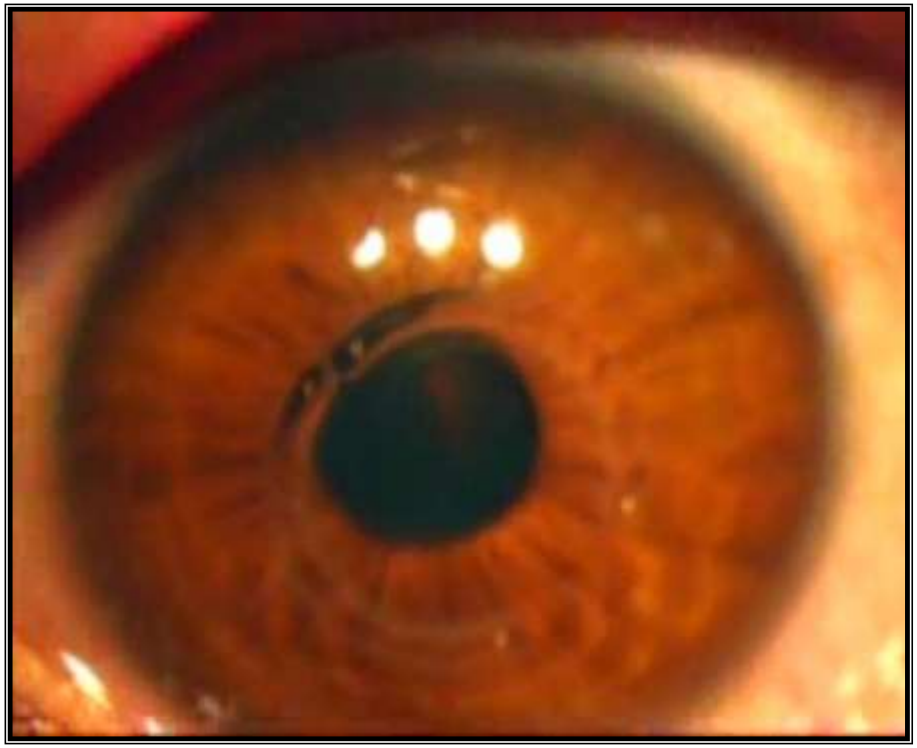
- Problem : one ring segment is only implanted with less effect


OD
Corneal thickness
OD
Tangential anterior
OD
Anterior elevation
OD
Posterior elevation
OD

Avoid!!!!

Trial of ring implantation by force to avoid endothelial perforation

Decentered created tunnel



- The tunnel creation should be done around the visual axis which is marked before docking
- Sometimes the corneal reflection appear shifted slightly down , and the centration is done away from the pupil
- The decenteration may be severe to the extent that rings cross the pupil


CSO

Pupil should be respected during centration after docking

Take care !!!!

Any suspicion in the accuracy of centration of the tunnel -----→ Abort

Migration and extrusion

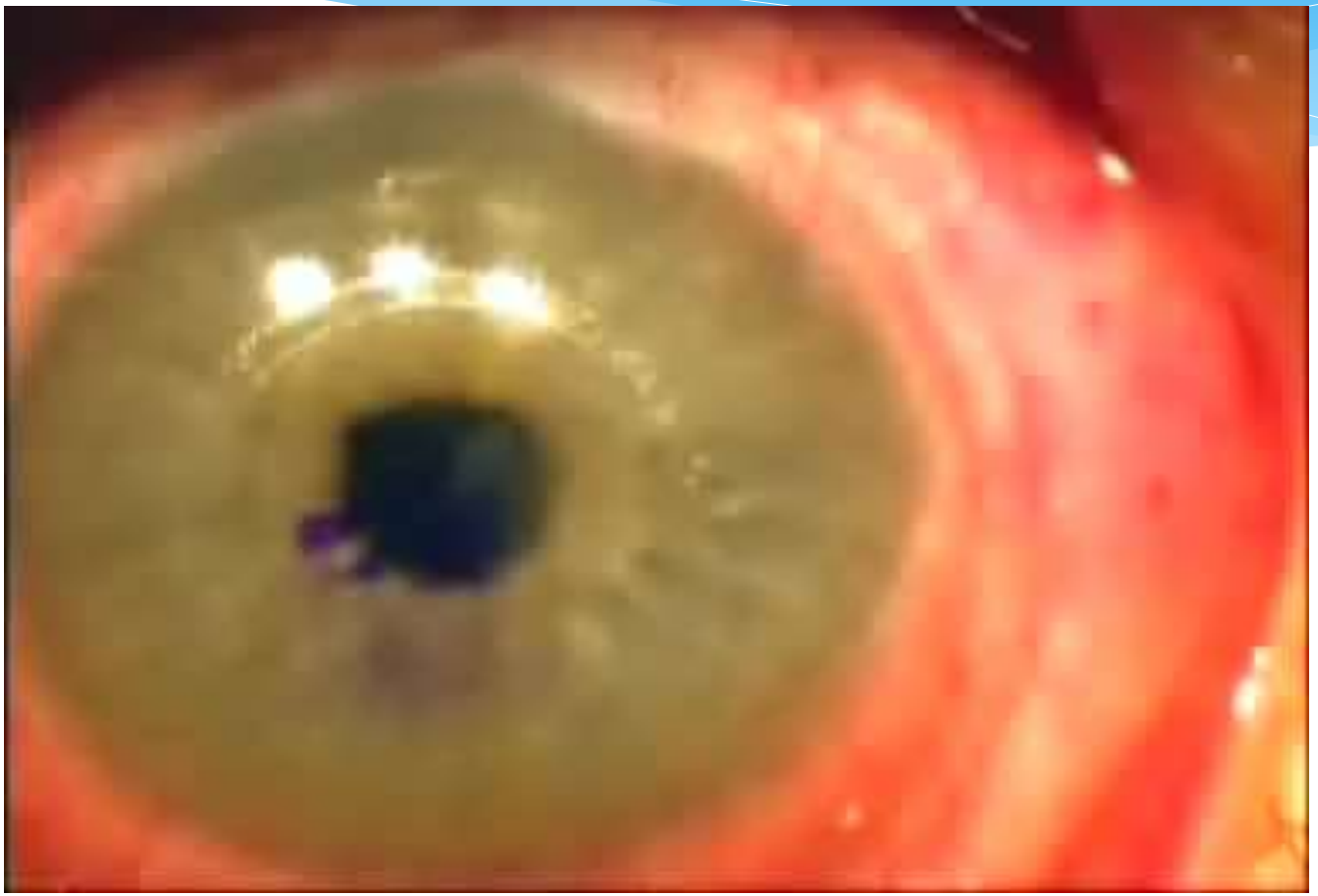
- Ring migration is an early stage before extrusion.
- Causes:

a- Thick segment in thin cornea

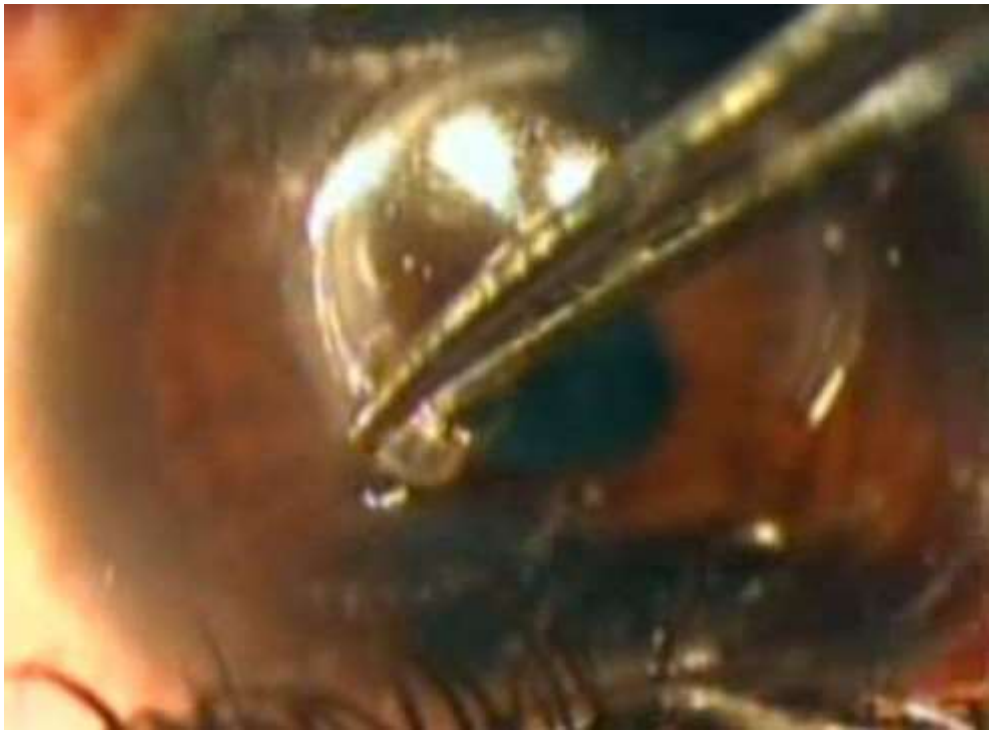
b- Implantation of segments near incision site

c- corneal melting

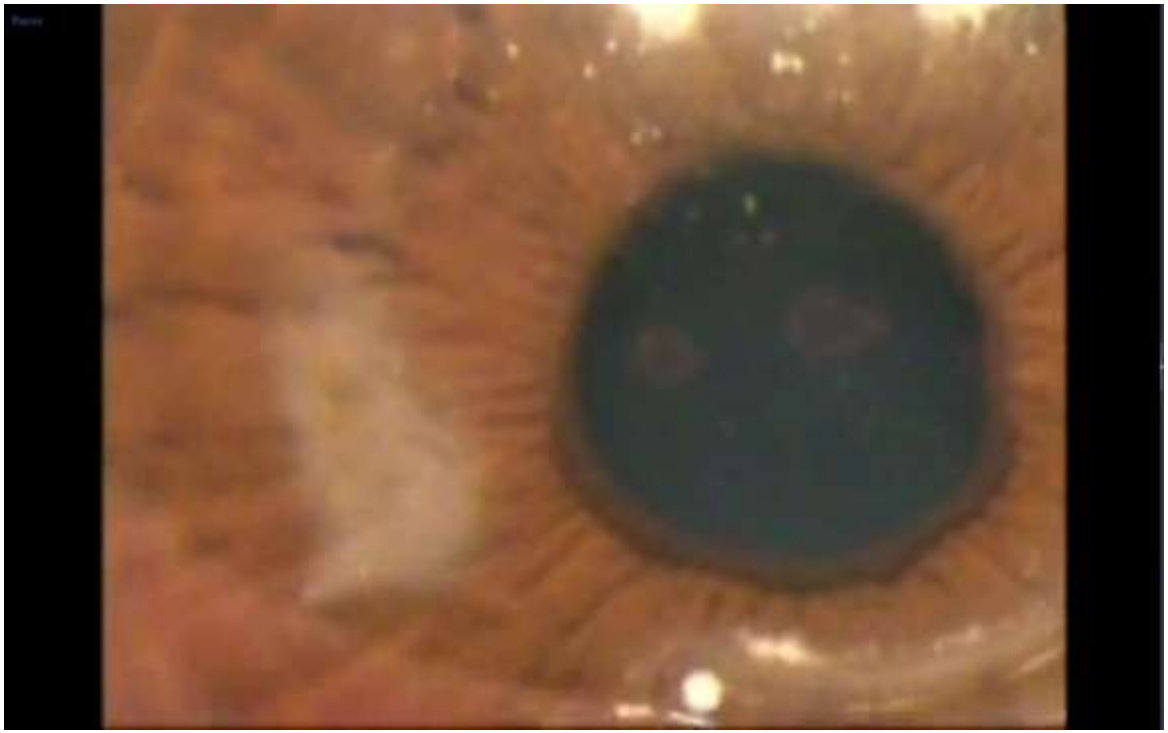
To avoid extrusion: Direct ring implantation



Once extrusion happened :Explantation is inevitable



Late case of extrusion ended by scaring



Don’t try to reimplant the ring inside the tunnel

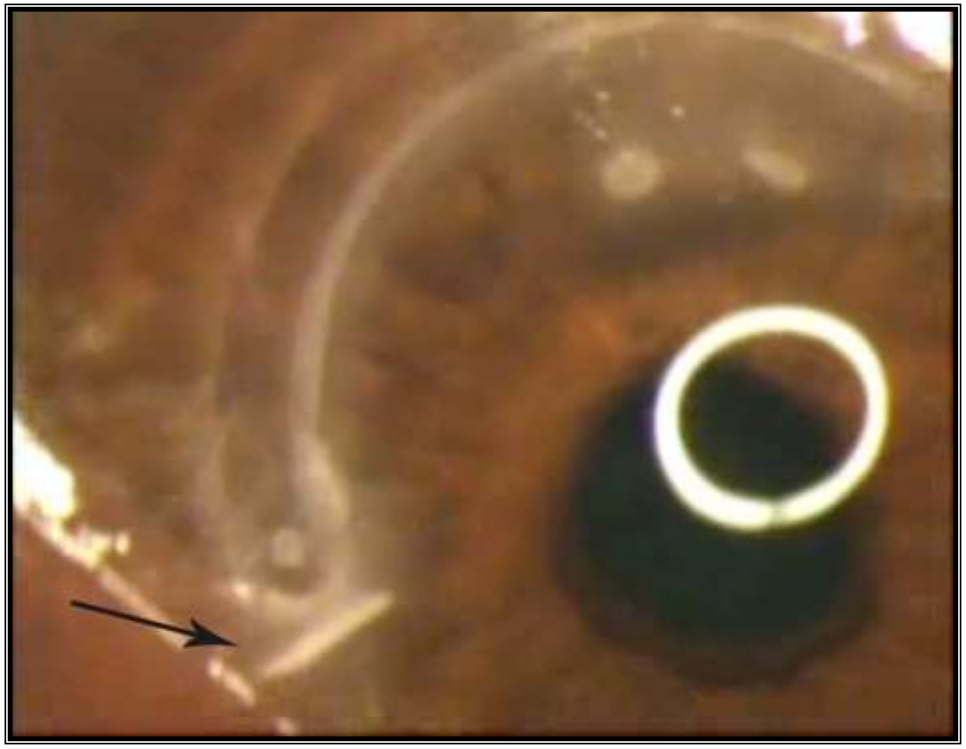
May lead to :

1- Infection

2- Endothelial perforation

3- Mostly migration and extrusion will recur.

Sterile Keratitis



- Immune reaction occurs in the tunnel around the ring in the form of white infiltrates.
- Only one case recorded in published paper.
- 2 cases reported in our center.
- Linked mainly to VKC cases.
- Respond well to topical steroids.

What should you fear???

-Strict follow up is needed

If no response to steroids with undercover of antibiotics

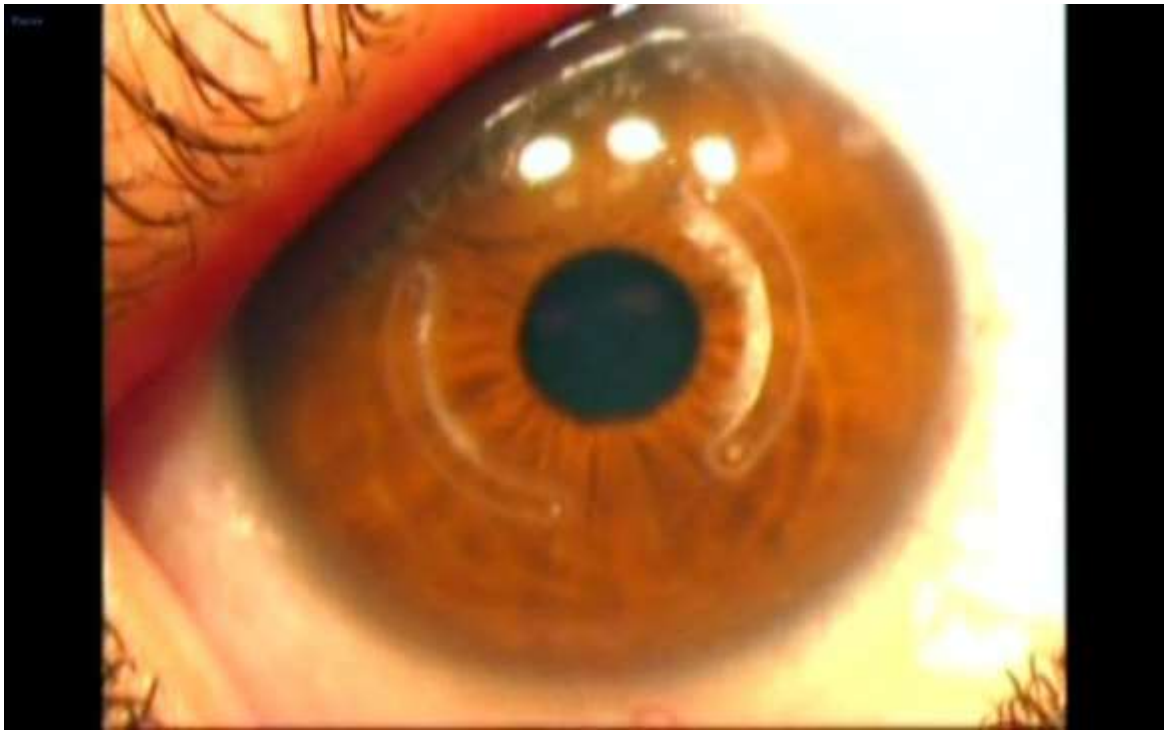
Therapy ----→ suspect infection

- In sometimes explanation is needed

My personal lesson from this case

Keep away from VKC cases

Crystalline deposits around rings



- Crystalline deposits in the channel of rings were reported in 2 eyes.
- The deposits aggregated in the space around rings , with no inflammatory manifestations

- No effect on the visual acuity with no accompanying haze.

Decision

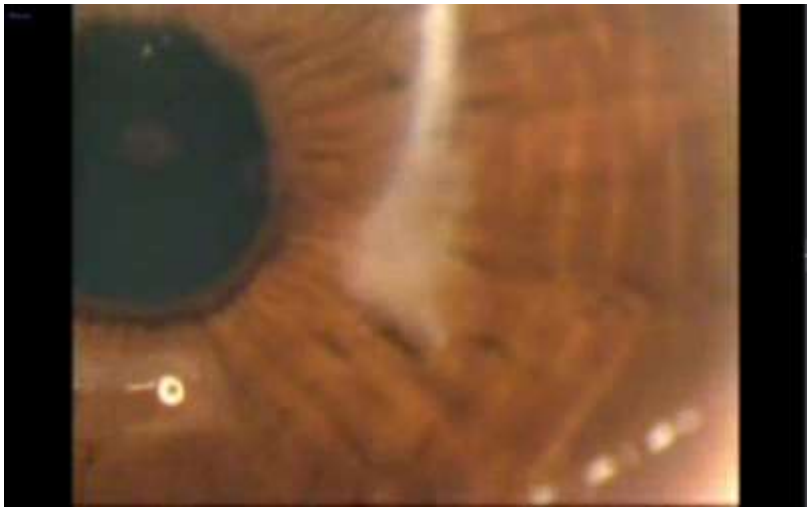
Follow up was done to exclude infection liability.

If no inflammatory manifestations --- →no intervention

Infection

- Usually started as low grade infection
- **Explantation** of the rings and intensive topical antibiotics are the only treatment.

Fate



At the end

Home massage

- We should know that Kerarings implantation with femtotunnel creation has a very low rate of complications
- Intraoperative complications can be avoided by experience as they are mostly related to the patient and the device.
- In postoperative complications any suspicion needs explantation of rings.

Thank you