

# Simultaneous Complete Intracorneal Ring Implantation with Intrapocket Collagen Cross- Linking for treatment of Keratoconus

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**No financial interest**



❖ **Objective** : *To evaluate visual and refractive outcomes after intracorneal continuous ring (ICCR) implantation combined with intrapocket corneal collagen cross linking (CXL) in patient with keratoconus(KC).*

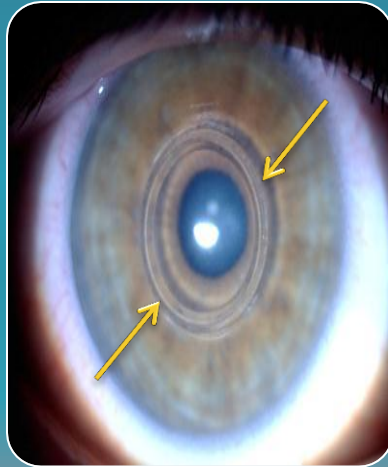
❖ **Setting** : *Eye Specialty Private Hospital, Baghdad, Iraq.*

# Patients and methods

A total 40 eyes for 34 patients with age range 20 -35 years were diagnosed to have KC by clinical slit lamp examination and Sirius corneal topography.

## Inclusion criteria:

1. No corneal scar
- 2.No history of ocular surgery
- 3.Minimal corneal thickness  $\geq 360\mu\text{m}$  measured by ultrasonic pachymetry (Tomey SP-100)
4. UDVA not better than 0.3 LogMAR and
- 5.keratometry ( K) reading  $>42.00$  diopters (D)using the following formula  $K=(K1+K2)/2$ .



In addition to keratometry (measured by Sirius topography)

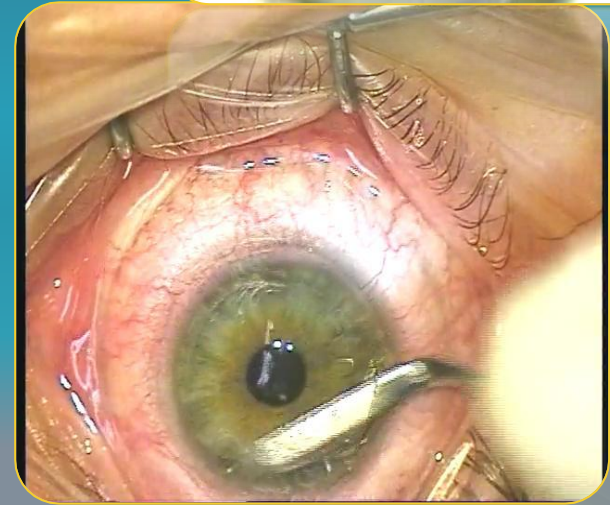
## Outcome measures include:

UDVA,CDVA, spherical and cylindrical component of manifest refraction ,and spherical equivalent(SE). Lines of improvement were calculated in logarithmic scales according to Log MAR notation . In all cases, CDVA is reported with spectacle correction. All these parameters measured at 1month, 6 months and 1year

# ***Surgical procedure:***

as recommended by (Dioptex GmbH,Linz,AUSTRIA)

- ❖ ***1<sup>st</sup> step : Creation of corneal pocket within the stroma by automated pocket maker micro keratome (Dioptex GmbH) the diameter of pocket 9mm, depth of 300  $\mu$ m. Except for a 3mm wide and 2mm long incision tunnel which located in temporal periphery of the cornea the pocket is closed along the entire circumference .***



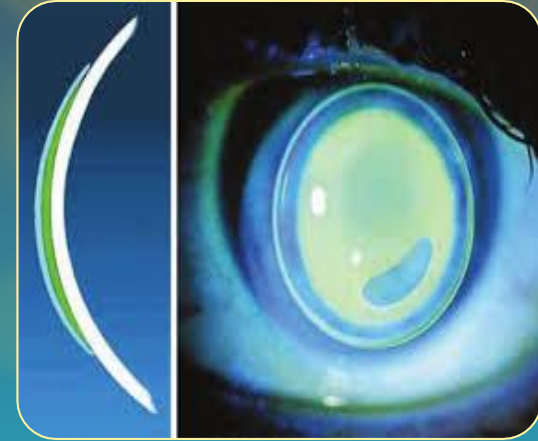
- ❖ **2<sup>nd</sup> step: Continuous irrigation of the pocket with a sterile standard dose of riboflavin (0.1 % riboflavin in 3 ml of 20% dextran 500 solution (Medio-Cross; Peschke Miditrade GmbH, Switzerland) for 3 minutes via standard cannula of 0.3- mm diameter through the incision tunnel**





❖ **3<sup>rd</sup> step** : The cornea was subjected to a 4 minutes irradiation treatment with UV-A light of 365nm (Peschke Meditrade GmbH, Clemont –Ferrand Switzerland) and UV intensity of 9 mW/cm<sup>2</sup>.

❖ **4<sup>th</sup> step** : Within 5 minutes after UV-A irradiation, a flexible Myoring (Dioptex GmbH, Linz, AUSTRIA ) implanted into the pocket through the small incision tunnel, centration of the ring within the pocket by forceps only.



# **Results:**

**The study evaluated 40 eyes of 34 patients with a mean age of 25.75 years. Preoperatively, the pachymetry at thinnest location range from (367\_555 $\mu$ m) and the mean keratometry (K) readings  $50.51 \pm 3.94D$ .**

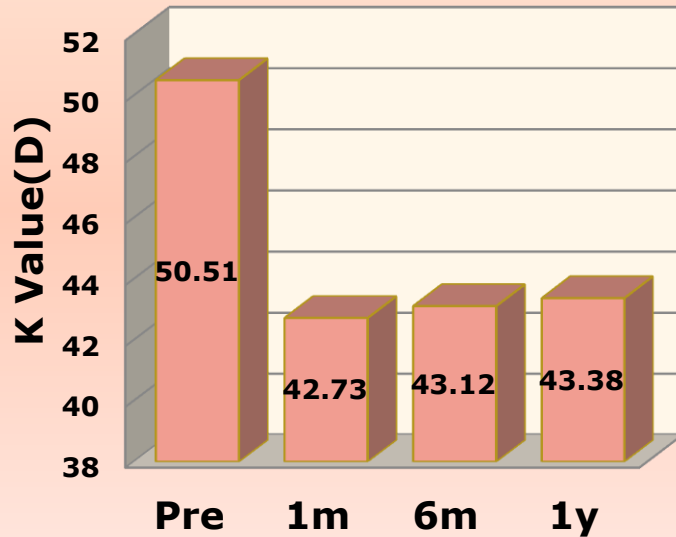
**Post operatively ,there was statistically significant improvement in the UDVA,CDVA ,K reading ,manifest spherical and cylindrical refractive errors ,and spherical equivalent ( $p < .05$ ).The mean UDVA improved by 13 lines , CDVA improved by 3.5 lines and the mean K reading decreased by 7.14 D ..**

# ***Complications:***

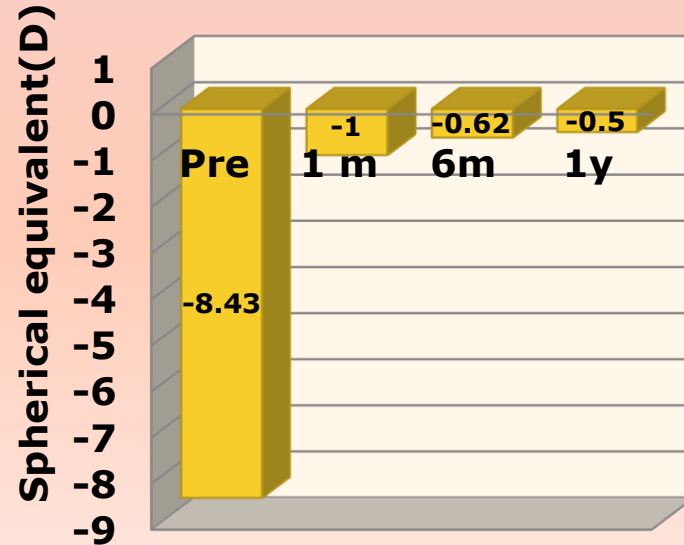
- ***No serious intraoperative complications occurred .***
- ***There were no postoperative complications . Glare and night vision problems were reported in 2 eyes . These eyes received pilocarpine 1% eye drop therapy for 3 months within the first postoperative year.***
- ***No ICCR was removed for side effects or complications.***



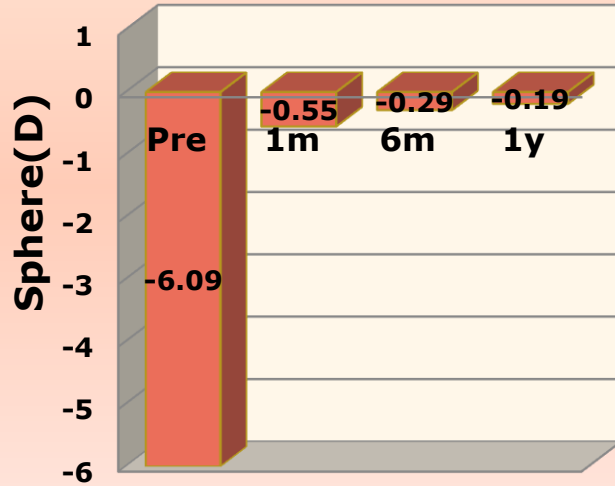
**Figure 1: Mean K reading over time**



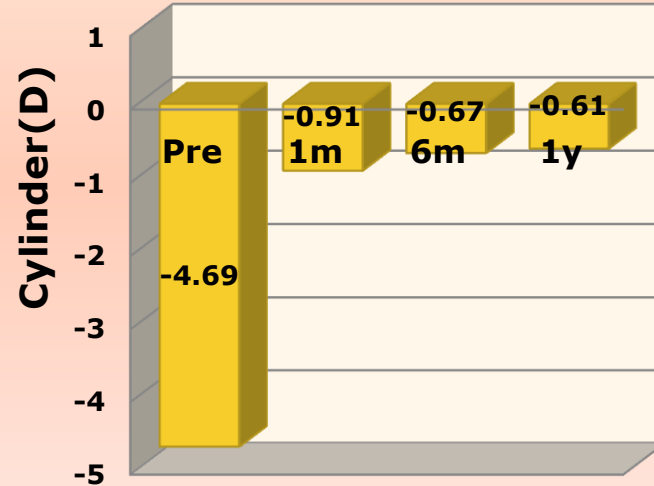
**Figure 2: Mean spherical equivalent over time**



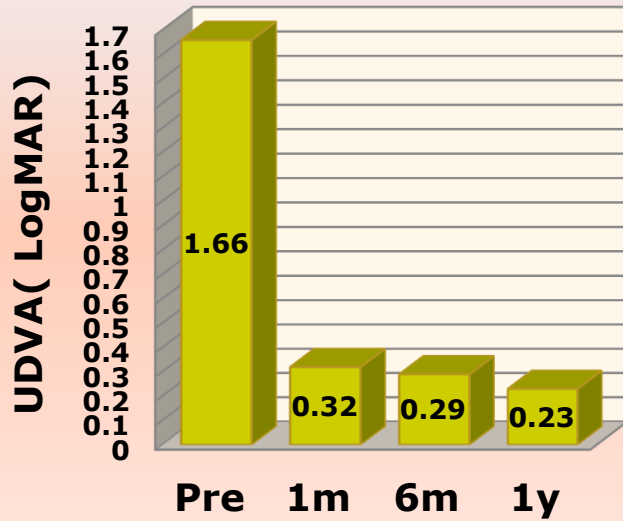
**Figure 3: Mean spherical error over time**



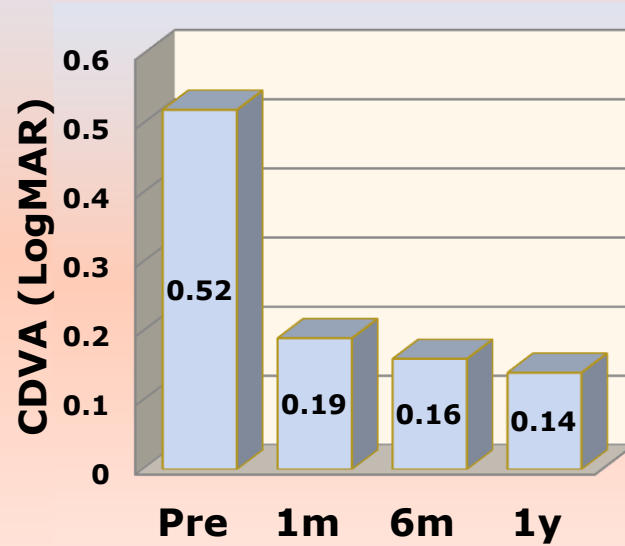
**Figure 4: Mean cylindrical error over time**



**Figure 5:UDVA over time**



**Figure 6:CDVA over time**



# ***Conclusions:***

***Treatment of KC with simultaneous ICCR implantation and intrapocket CXL significantly improved visual and refractive outcomes .***

***The UDVA and CDVA continuously improved during the 1<sup>st</sup> year postoperatively.***

***† The procedure not FDA approved***