

원시교정술

Surgical Correction of Hyperopia

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Abstract

Surgical modalities to correct hyperopia include photorefractive keratectomy (PRK), laser in situ keratomileusis (LASIK), Ho:YAG laser thermal keratoplasty (LTK), conductive keratoplasty (CK), phakic IOL, and refractive lens exchange. Excimer laser - based techniques, which include LASIK, LASEK, and PRK, are currently the most popular forms of surgery to correct not only myopia and astigmatism but also hyperopia. These techniques have been reported to be safe and effective for both primary surgeries and enhancements. However, various complications related to the flap and loss of best corrected visual acuity associated with a smaller optic zone, decentration, and irregular ablation caused by longer treatment time in high hyperopia over +5 diopter can have adverse effects on visual outcomes. The development of non - excimer laser - based techniques offers viable alternatives for laser vision correction techniques. More recent non - excimer - based thermal refractive techniques include LTK and CK. Earlier forms of thermal techniques showed a lack of predictability and stability, resulting in no further development of them. Recently, CK, a laserless, radiofrequency - based technique, has been approved by the FDA for the correction of low to moderate hyperopia even though the refractive instability has not been solved yet. In high hyperopia, lens approach like phakic IOL or refractive lens exchange instead of corneal surgery is preferred. ICL (Implantable contact lens) and Artisan is the most popular lens model that has well proven clinical results concerning its safety and effectiveness. Accommodative IOL or multifocal IOL could be the solution for pseudophakic presbyopia in refractive lens exchange in the future.

Keywords : Excimer laser; Hyperopia; Keratoplasty; Phakic IOL; Refractive lens exchange

(hy-

peropia) 가

가

가 .

Baltimore Eye Center

40

가 가

(1).

가 가

가

가

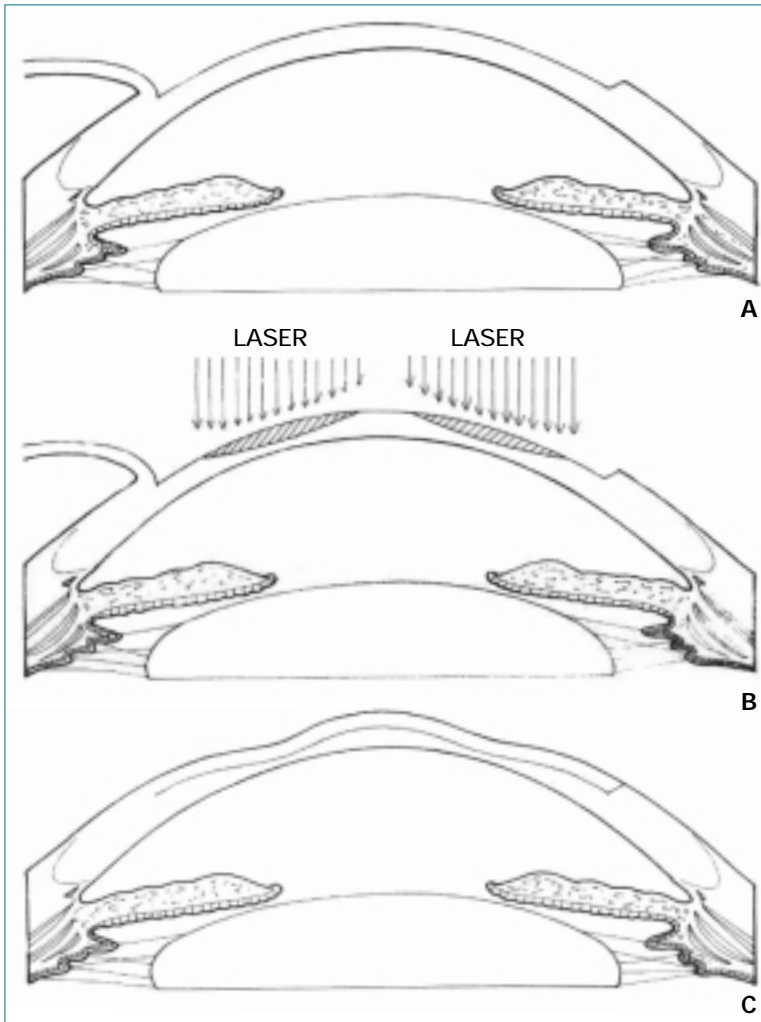
가

가

(accommodation)

(latent hyperopia)

가 가
(manifest hyperopia)
· 1970
(presbyopia) 10
20 가
가 가 가
가 가 1970 Fyodorov
(radial keratotomy, RK) Trokel
excimer laser
가 가
가 (laser in situ keratomileusis, LASIK)
가 가
· 가
30~40
가 10
· 100
· 가
· 가 (keratomileusis),
(epikeratophakia), (intra-
corneal lens)
가 (hexagonal keratotomy), purse-string
가 가
· 가
, (laser thermal
keratoplasty, LTK, conductive keratoplasty, CK),
가 가 (phakic IOL)



(A) 가 (C) (B)

1.

(clear lens extraction)

(2, 3).

(3).

(4).

2

(pupil margin)

1

가

5.5 ~ 6.0mm,

8.5 ~ 9.0mm가

가

가

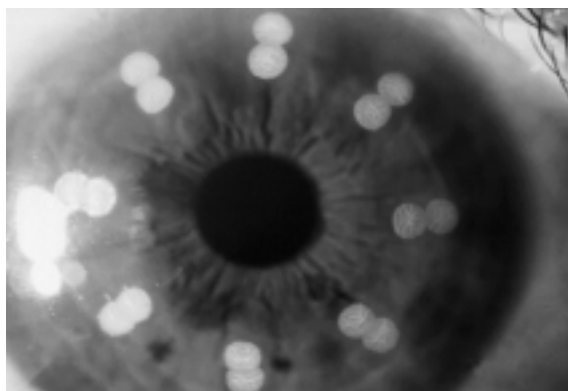
가 가

가

VISX S4 Nidek EC 5000
offset rotating slit scanning
beam

Alcon LADARVision 4000,
Bausch & Lomb's Technolas Ke-
racor 217z, Carl Zeiss Meditec
MEL 80, Wavelight Allegretto
scanning spot beam

가



2. Ho:YAG

7, 8mm

16

8

2

가

가

(autocentering)

(autotracking system)

가

가

(positive angle

coaxial light

kappa)

가

+5D

(PRK)

(LASIK)

가

(5~9).

가

9mm

가

가

가

가

가

가

가 가

가

(5~9).

가

(8).

+5D

(8).

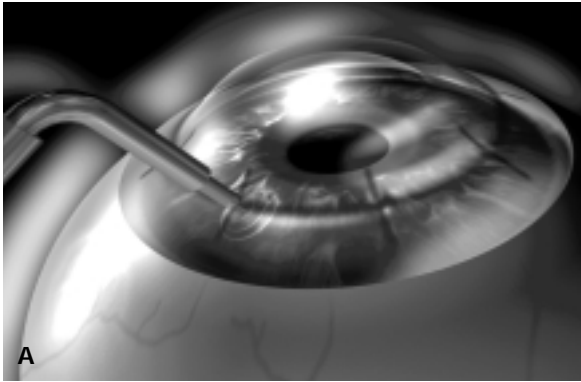
가

(multifocality)

가

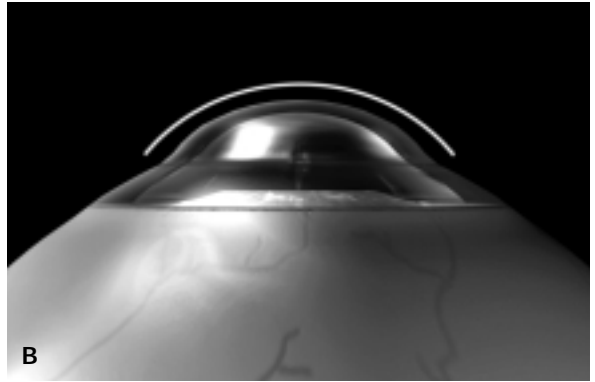
가

가



3. A CK keratoplast tip

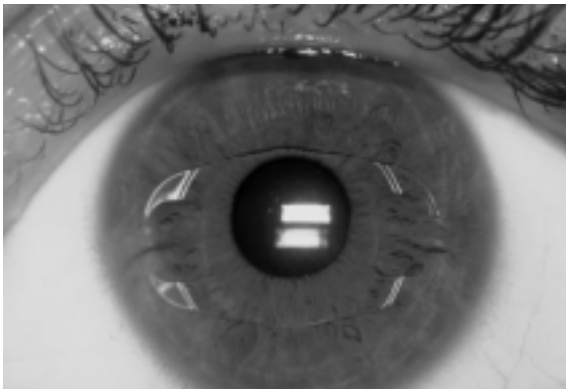
가



B

가

(B).



4. Artisan 가 (claw) (enclavation)

frequency

가

constriction band가

가 (3).

가

가

Ho:YAG

(2) 2000 40

+2.75D 가

FDA

가

6, 7, 8mm

(10).

LTK

CK

probe tip

(radiofrequency)

treatment spot

8~32

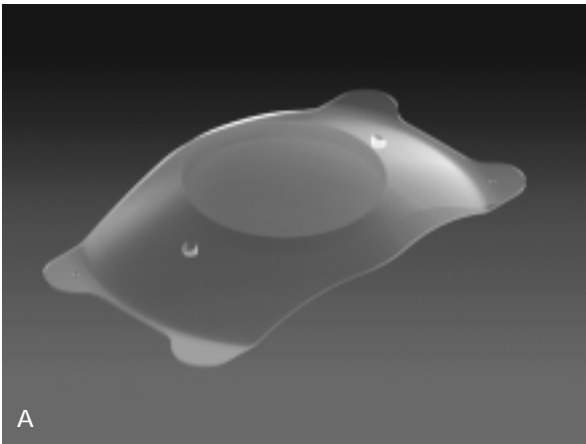
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가

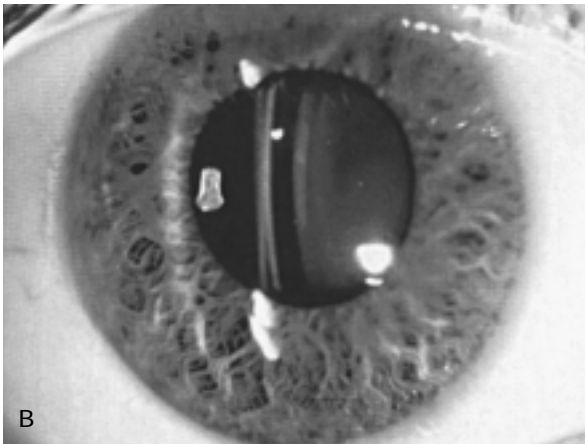
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radio-

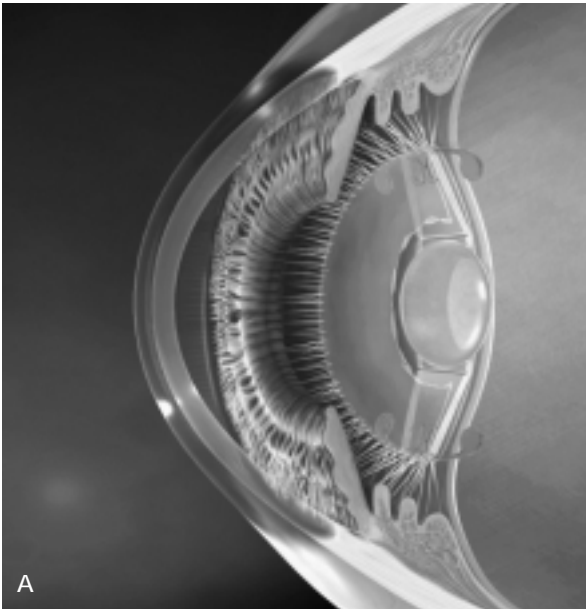
가



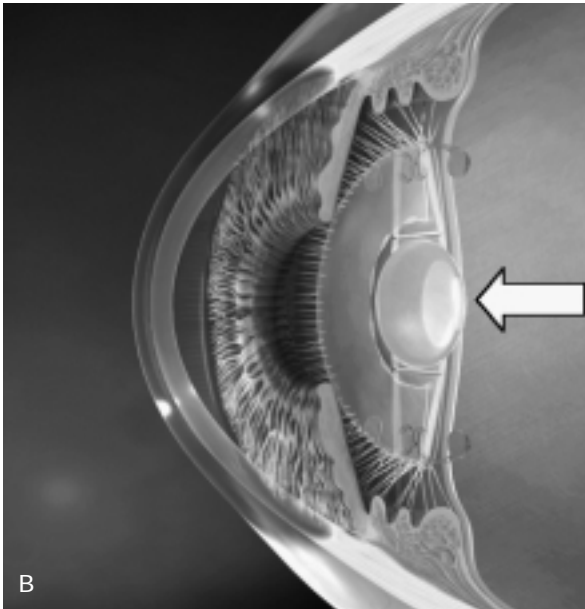
5. ICL (A)



(B) foldable lens



6. FDA 가 가 (A) 가 (B) 가



Crystallens 가 가 29% 가 Ho:YAG LTK (11).

가 crystalens (5)
 가
 , FDA
 가 crystalens 75%가
 - 10
 가 +5 ~ +6 가 (14, 15).
 가 (12, 13). 가 .
 가 가
 Artisan (3) Verysis
 ICL (가
 4)가 . 가
 가 가
 (12, 13).
 .
 (emmetropia)
 (refractive
 lens exchange, RLE) . 가
 . 가
 . 가
 (accommodative IOL)
 (multifocal IOL)
 . 2003 FDA

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