المؤتمر السنوي الدولي للجمعية الرمدية المصرية
INTERNATIONAL CONGRESS OF THE
EGYPTIAN OPHTHALMOLOGICAL SOCIETY
EOS 2023

Different types of microkeratome and laser platforms

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Surgeon

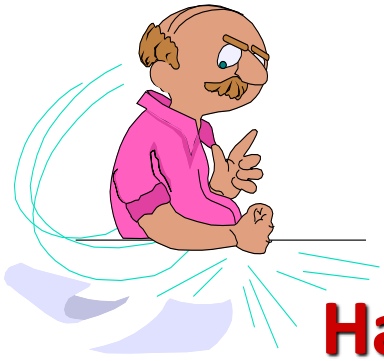
- Knowledge
- Training
- Supervised Approach

Knowledge

Indications / Contraindications

Pre Operative Assessment

Surgical Technique



Objective

Happy Patient

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Counseling

- patients are ***refractive demanding*** and their aim is to get rid of glasses.

EXPECTATIONS

REALITY

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- ***Efficacy*** : Corrects All Refractive Error
  (PostOp Uncorrected VA vs PreOp BSCVA)
- ***Predictability*** : Avoids post operative surprises
  (% of Eyes +_ 1 D → +_ 0.5 D)
- ***Safety*** : Avoids short / long term complications
  (% of loss of BSCVA)
- ***Stability*** : maintain correction over time

Patient Expectation

- ***Efficacy*** : will see ***Better*** without glasses or C L
- ***Predictability*** : this will happen **100 %**
- ***Safety*** : Chance of Comlication is **Zero %**
- ***Stability*** : Correction is there ***Forever***

Evaluation of Refractive Surgery

Realistic Expectation

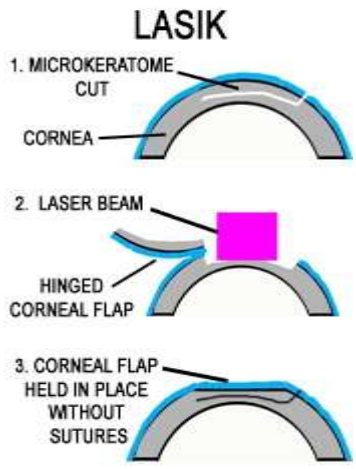
- ***Efficacy*** : will see ***Same*** without glasses or C L

(only better if he has preop problem, HOA, Topo)

- ***Predictability*** : this will happen ***80-98 %***
- ***Safety*** : Chance of Comlications is ***2-5 %***
- ***Stability*** : Correction is there ***5-10 Ys ?***

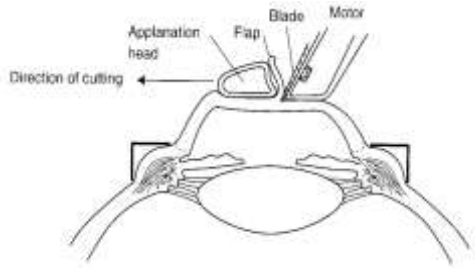
LASER IN SITU KERATOMILEUSIS (LASIK)

- Flap making
- Laser photoablation



- Methods of flap creation have changed over the years from the evolution of the mechanical microkeratome to the introduction of the femtosecond laser keratome.

- The mechanical microkeratome uses shear force through the use of an oscillating blade, traveling across the cornea in a torsional or translational approach.



A Common Platform

Evolution® Control Unit

Operates the One Use-Plus, M2 Single-Use, Epi-K™ and the ALTK-CBm System.

Moria's console offers a wealth of features to enhance performance, safety, flexibility, and ease-to-use:

- Two high performance pumps maintain safe vacuum.
- "Slow vacuum release" option provides gentle release to minimize potential retinal damage.
- Runs on wall current, with built-in back-up battery for uninterrupted use.

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The One Use-*Plus* System

One Use-*Plus* SBK offers accuracy, predictability and reproductibility equivalent to femto SBK, with faster recovery and at a fraction of the cost.

- Pre-assembled, linear, automated microkeratome.
- Intraoperative visibility.
- Nasal hinge.
- Several head sizes available for customized flap thicknesses from 100µm[1] to 140µm[2] on average.
- Several Single-Use suction rings to accommodate for all keratometries.

The M2 Single-Use System

- Pre-assembled, rotating, automated microkeratome.
- 360° hinge position.
- Several head sizes available for customized flap thicknesses including for Thin-Flap LASIK (110-120µm[3] on average).
- Multiple suction rings allow intra-operative customization of flap characteristics.

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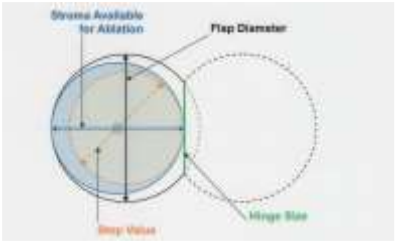

Nomogram M2 *Reusable / Single Use*

Ring and Stop Selection

Steepest K	Ring	Step	Flap diameter (mm)	Hinge size (mm)
39	-1	7.5	8.8	4.5
40	-1	7.5	9.0	5.0
	-1	8*	9.0	4.1
41	-1	8	9.3	4.6
	0	7.5	8.8	4.5
42	-1	8	9.5	5.1
	0	7.5	9.0	5.0
43	-1	8.5	9.8	4.8
	0	8	9.3	4.6
	1	7.5	8.8	4.5
44	0	8	9.5	5.1
	1	7.5	9.0	5.0
45	0	8	9.8	5.6
	1	7.5	9.3	5.4
46	2	7.5	9.0	5.0
	2	8*	9.0	4.1
47	2	7.5	9.3	5.4

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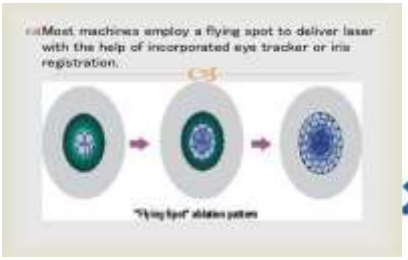
Excimer Laser Delivery Systems

- First Generation
  Broad beam lasers
- Second Generation
  Scanning slit lasers
- Third Generation
  Flying spot lasers



TREATMENT TECHNIQUES

Wave front optimized

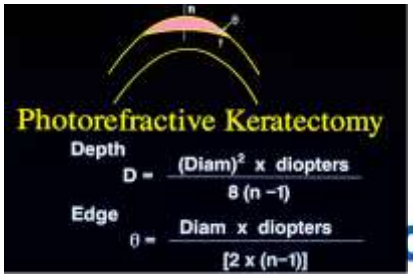
Wave front Customized Treatment

MUNNERLYN EQUATION

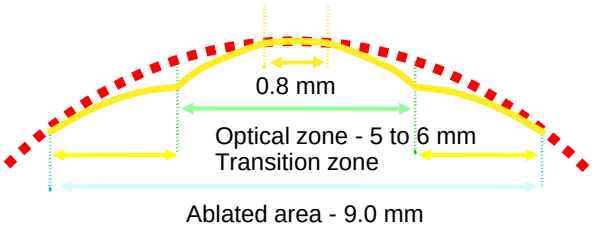
Diameter and Depth per Diopter

•relating diameter and depth of the ablation to the required dioptric change.

Diameter (mm)	Depth (um)
6.0	11.9
7.0	16.2
8.0	21.2



HYPEROPIA



The ablation extends out to 9 mm
The zone of deepest treatment is at approximately 5 mm (but may be varied from 3 to 5 mm)
Ablation depth at 5 mm is 8 µm/diopter
Maximum depth approximately 50 µm

CROSS-CYLINDER ABLATION PROFILE

Mixed astigmatism is corrected using a cross cylinder technique

The cross cylinder ablation is performed with a combination of myopic cylinder and a hyperopic cylinder

The total ablation depth equals the sum of the depth of the myopic ellipse plus the hyperopic cylinder

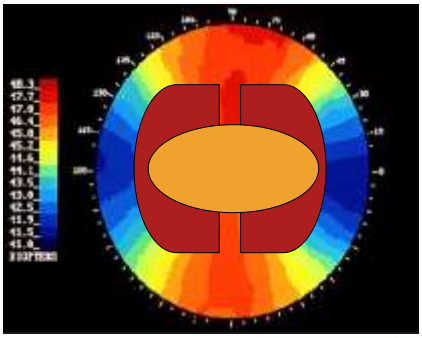
CROSS-CYLINDER ABLATION PROFILE

The dimensions of the mixed astigmatism profile are 9.0mm x 6.5 mm

It is important to create a flap that will allow exposure of at least 9.0 mm of stroma for the treatment

Care must be taken not to ablate the flap hinge or underside of the flap

CROSS-CYLINDER ABLATION
CYLINDRICAL STEEPENING WITH CYLINDRICAL FLATTENING



i.e., -1.00 +3.00 x 90
Convert to hyperopic and myopic surfaces
H Cylinder Surface Power: +2.00 x 90
M Cylinder Surface Power: -1.00 x 180

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WHAT IS WAVEFRONT OPTIMIZED?

A marketing term to highlight the difference between WaveLight's ablations and the "conventional" lasers.

Developed by Michael Mrochen, PhD and Theo Seiler, MD, PhD in an effort to reduce the aberrations caused by treatments.

A "Pure Refractive Treatment" Leaves higher-order aberrations unchanged.

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CORNEAL CURVATURE AFFECTS PERIPHERAL ABLATION

1. "Cosine" Effect
- Beam ovalization toward the periphery
- Causes lower energy / area (fluence)
- May cause energy to drop below ablation threshold

2. Peripheral Reflectivity
- Angle of incidence approaches critical angle

WAVEFRONT-OPTIMIZED

Compensated for all these effects

Results in delivery of refractive correction over full OZ
– Blends peripheral to OZ

Minimal/No increase in spherical aberration

A "Pure Refractive Treatment"

Wave front customized LASIK

Higher Order Aberrations

Defined as: Any refractive error that cannot be corrected by spherocylindrical lens combinations

Examples include: coma, spherical aberration etc,….

Higher order aberrations can make up to **17%** of the total aberration error.

LOWER-ORDER ABERRATIONS (LOA)

HIGHER-ORDER ABERRATIONS (HOA)

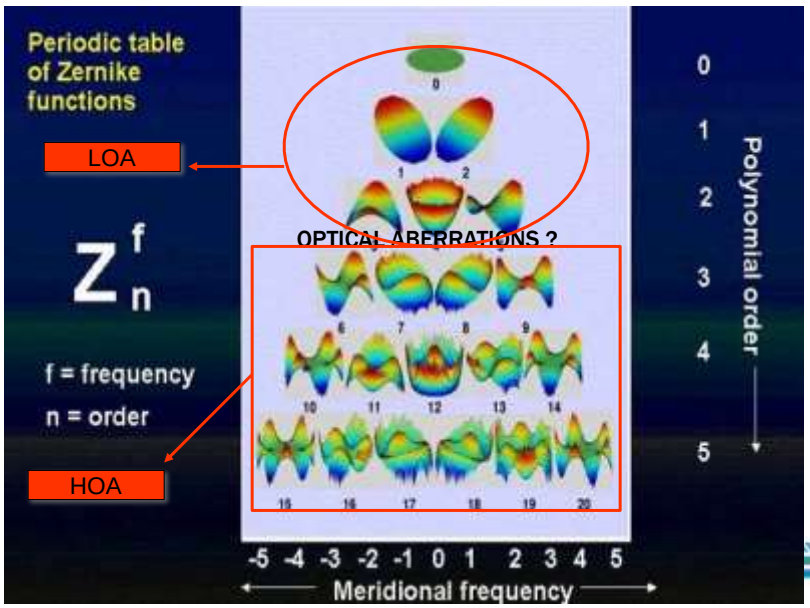
OPTICAL ABERRATIONS ?

- **1st and 2nd Zernike Orders**
- **Defocus & Astigmatism**

Corrected By Glasses

- **Starting From 3rd Zernike Order**

Corrected By ????



POOR VISUAL QUALITY AFTER CORNEAL REFRACTIVE SURGERIES

INDICATIONS

- **Post RK / AK**
- **Decentered ablations**
- **Small optical zone**
- **Central island**
- **Post PKP**
- **Cases of corneal irregular astigmatism**

THANK YOU

See you next year

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24-26 APRIL 2024
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