WAVEFRONT-GUIDED TRANSPRK

Shady T. Awwad, MD

Associate Professor of Ophthalmology
Director, Refractive Surgery center
American University of Beirut Medical Center
IMPORTANCE OF
TRANS-EPITHELIAL APPROACH
IN IRREGULAR CORNEAS
THE EPITHELIUM IS A MASKING AGENT
Epithelium as a masking Agent

- Epithelium
- Stroma
Simple Epithelial Removal
Epithelial Remodeling

Epithelium

Stroma

SAME
Epithelial Remodeling

Epithelium

Stroma

BETTER
Epithelial Remodeling

Epithelium

Stroma

WORSE
Trans-epithelial Ablation
Trans-epithelial Ablation

- Epithelium
- Stroma
Which Topography is More Challenging for Epithelial Remodeling?

- Mechanical or Alcohol
- Stroma
- Trans-epithelial
Wavefront-guided TPRK

CHALLENGES
ENSURE A MINIMUM STROMAL ABLATION DEPTH FOR VITAL AREAS
120 μ
Final stromal carved lens

55 μ epith.
Final stromal carved lens

Target OZ = 6.5
Actual = 5.5

55 μ

65 μ epith.

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Final stromal carved lens

55 μ epith.
Final stromal carved lens

Target OZ = 6.5
Actual = 5.5

CWG ablation
Asph ablation

65 μ epith.

55 μ
IN WG-TPRK, IT IS VITAL TO CHECK

STROMAL ABLATION DEPTH VIS A VIS EPITH THICKNESS & OZ
KERATOCONUS
More Stromal Ablation at the Cone

- Epithelium
- Stroma

Thinnest Epithelium
Wavefront-guided Ablation is More at the Cone

A. Corneal Topography
B. Wavefront analysis based on topography
C. Laser ablation profile in 3-D
D. Laser ablation profile in 2-D
POST DALK & PENETRATING KERATOPLASTY
Optical Zone Constraint

- Interface
- Bowman’s
- Descemet’s
Target OZ=7.75
Actual =7.50

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Target OZ = 6.5
Actual = 5.5

65 μ epith.

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POST LASIK/PRK
No Previous Ablation

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Undercorrection - Epithelium After previous Myopic Ablation

Final stromal carved lens

55 μ epith.

Previous Myopic Ablation

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Epithelium After previous Hyperopic Ablation

Final stromal carved lens

Overcorrection

55 μ epith.

Previous Hyperopic Ablation

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POST RK
POST RK
Undercorrection - Epithelium After previous RK

Final stromal carved lens

Potentially irregular ablation

55 μ epith.

Previous RK
(GU)ESTIMATE REFRACTION
REFRACTION:
LOWER vs. HIGHER ORDER ABERRATIONS
Ocular Wavefront Ablation Map

Corneal Wavefront Ablation Map

117 μm

118 μm
SELECTIVE ABLATION

LESSER DIFFERENCE IN STROMAL ABLATION BETWEEN AB. FREE & CWG

LESS RISK OF REFRACTIVE SURPRISE
LESS BIOMECHANICAL RESPONSE:
LESS REFRACTIVE SURPRISES

Forward Pull of the stromal lamellae

Additional Peripheral ablation

Subsequent central flattening: hyperopic shift

Additional Peripheral ablation

Forward Pull of the stromal lamellae

Pos. Spherical Aberration TX: biomechanical response
Customized TransPRK

Decentered Ablation in a 24 year old medical student; BSCVA 20/70

Conversion to Corneal Higher order Aberrations

TX: -1.00-2.50x165 Taking into account previous myopic TX

Corneal wavefront-guided treatment plan: Minimize depth & unnecessary HOA

Check OW Refraction at different OZ & generate OWG & internal HOAs
Ocular WG treatment plan: Check Internal HOAs, Compare depth vis a vis

Similar to CGW shape & depth

CWG TransPRK after checking final depth vis a vis OZ

Regular topography

Plano-2.75x165 = 20/70

1 Month after CWG TransPRK...UCVA 20/25, BCVA 20/20 with +0.50-1.00x20

Decentered Ablation in a 24 year old Medical student; BSCVA 20/70
EPITHELIAL PACHYMETRY DRIVEN CWG TRANSPRk

UPCOMING GENERATIONS OF DUAL OCT/TOMOGRAPHY
PEACE OF MIND