POST LASIK ECTASIA
Risk Factors & Screening

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Post LASIK Ectasia

- Epidemiology: rare, unilateral & very late
Post LASIK Ectasia: 0.04% - 0.9%

17 years post Lasik

- Epidemiology: rare, unilateral & very late

- SMILE & LASIK EXTRA: not protective


Post LASIK Ectasia

- Epidemiology: rare, unilateral & very late
- SMILE & LASIK EXTRA: not protective
- Tunisia Ectasia Study

ENQUETE NATIONALE SUR LES FACTEURS DE RISQUE DE L’ECTASIE CORNEENNE POST-LASIK

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### Randleman Score

#### Table 1. Ectasia Risk Factor Scoring System

<table>
<thead>
<tr>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography Pattern</td>
<td>Normal/yasmetrical bowtie</td>
<td>Asymmetric bowtie</td>
<td>Inferior steepening/ skewed radial axis</td>
<td>Form frusti keratoconus</td>
<td></td>
</tr>
<tr>
<td>Residual Stromal Bed Thickness (μm)</td>
<td>&gt;300</td>
<td>280-299</td>
<td>260-279</td>
<td>240-259</td>
<td>&lt;240</td>
</tr>
<tr>
<td>Age</td>
<td>&gt;30</td>
<td>26-29</td>
<td>22-25</td>
<td>18-21</td>
<td></td>
</tr>
<tr>
<td>Preop Corneal Thickness (μm)</td>
<td>&gt;510</td>
<td>481-510</td>
<td>451-480</td>
<td>430-450</td>
<td>&lt;430</td>
</tr>
<tr>
<td>Preop Spherical Equivalent Manifest Refraction (D)</td>
<td>-8 or less</td>
<td>-8 to -10</td>
<td>-10 to -12</td>
<td>-12 to -14</td>
<td>&gt;-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cumulative Risk Scale Score</th>
<th>Risk Category</th>
<th>Recommendations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1 (Low risk)</td>
<td>Proceed with LASIK or corneal ablation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 (Moderate risk)</td>
<td>Proceed with caution; consider special informed consent; safety of surface ablation has not been established</td>
<td>Consider IVA/E or ICRS, stability, degree of stigmatization, between eye topographic asymmetry, and family history</td>
<td></td>
</tr>
<tr>
<td>4 or more (High risk)</td>
<td>Do not perform LASIK, safety of surface ablation has not been established</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Randleman Score Validity

- **High Score**: 50-92% ectasia
- **Low Score**: 6-50% ectasia
Tunisia Ectasia Study

- Low Randleman score: 25%

- High Score: 50-92% ectasia
- Low Score: 6-50% ectasia
- Non independent & non weighted factors
Pachymetry

- Non Independant : litterature (450-500 µ)

Long-term observation and evaluation of femtosecond laser-assisted thin-flap laser in situ keratomileusis in eyes with thin corneas but normal topography. 

Pachymetry

- Non Independant: litterature (450-500 µ)

- Epidemiology:

Comparison of corneal thickness and biomechanical properties between North African and French patients.
Tunisia Ectasia Study

Pachymetry

515µ ± 21 (487-572µ)

Biomechanical weakening

- Residual Stromal Bed : 200 >> 350 µ
Biomechanical weakening

- Residual Stromal Bed: 200 >> 350 µ
- Percent Tissue Altered: < 40%


Residual Stromal Bed

R.S.B.: 310µ ± 24 (273-350)
Abnormal Topography

- Major & Independant factor : 49-90% ectasia

Critères qualitatifs: 85% forme suspecte

Critères quantitatifs:
- I-S > 1,4 : 15%
- SRAX: > 20°: 23,5%
**Abnormal Topography**

- Major & Independant factor: 49-90% ectasia
- Abnormal topography: 5.7% ectasia
- Normal topography: 0.05% ectasia


**KERATOCONUS**

- Cornea morphology: no bio marker
KERATOCONUS

- Cornea morphology: no bio marker
- Topography: spatial resolution 20-60 X
KERATOCONUS

- Cornea morphology: no bio marker
- Topography: spatial resolution 20-40 X
- Assymetry: I-S index

I-S Index (Rabinovitz)

1.2 >> 1.4

Computer-assisted corneal topography in family members of patients with keratoconus. Rabinowitz et Al Arch Ophthalmol, 1990
KERATOCONUS

- Cornea morphology: no bio marker
- Topography: spatial resolution 20-40 X
- Assymetry: I-S index
- Cut off value: sensitivity

Cut off value

Normal  KC-suspect  Stage 1 KC  Stage 2 KC  Stage 3 KC

SUBCLINICAL KC

Cut-off

False negative  False positive

Topographic criterion
Cut off value: \textit{specificity}

[Diagram showing distribution of values with cut-off points for specificity and sensitivity]

Cut off value: \textit{specificity} / \textit{sensitivity}

[Diagram showing distribution of values with cut-off points for specificity and sensitivity]
Cornea morphology: no bio marker

Topography: spatial resolution 20-40 X

Asymmetry: I-S index

Cut off value: sensitivity

Composite index: automated detection

Automated keratoconus screening with corneal topography analysis.
KERATOCONUS

- Cornea morphology: no bio marker
- Topography: spatial resolution 20-40 X
- Assymetry: I-S index
- Cut off value: sensitivity
- Composite index: automated detection
- Additional tools: none discriminant nor superior

KERATOCONUS


KERATOCONUS

KERATOCONUS

- Topography (spatial resolution)
- Tomography (irregular)
- Aberrometry (coma)
- Biomechanic (morphology)
- HD OCT: cornea & epithelium


Distinguishing between contact lens warpage and ectasia: Usefulness of optical coherence tomography epithelial thickness mapping.
Long-Term Tomographic Evaluation of Unilateral Keratoconus
Imbornoni et Al Cornea. 2017

Validation Group

- Family Cohort
- Clinical keratoconus : stage I
- Fruste Keratoconus

Computer-assisted corneal topography in family members of patients with keratoconus. Rabinowitz et Al Arch Ophthalmol. 1990
 Validation Group

Fruste Keratoconus:

Fruste Keratoconus: lower descriminance lower cut off value

Keratoconus Screening Indices and Their Diagnostic Ability to Distinguish Normal From Ectatic Corneas. Shetty et Al. Am J Ophthalmol. 2017
Validation Group

Fruste Keratoconus: lower descriminance lower cut off value

Corneal epithelial thickness mapping using Fourier-domain optical coherence tomography for detection of form fruste keratoconus. Temstet et Al, J Cataract Refract Surg, 2015

Iatrogenic Ectasia

Keratoconus: major & independent risk factor
Iatrogenic Ectasia

- Keratoconus: major & independent risk factor
- Topography: asymmetry (I-S)

- Cut off value: sensitivity > specificity
Iatrogenic Ectasia

- Keratoconus: major & independent risk factor
- Topography: asymmetry (I-S)
- Cut off value: sensitivity > specificity
- Additional tools & risk factors: none discriminant

Evidence Based Medicine

LASIK CALLED SAFEST, MOST SUCCESSFUL ELECTIVE PROCEDURE IN THE WORLD

Eric D. Donnenfeld
AAO 2017
Société Tunisienne d’Ophtalmologie
37ème Congres
5-6-7 Avril 2018