Corneal Epithelial Changes in Eyes With Post Traumatic Recurrent Corneal Erosion: Comparison With Fellow Eyes and Healthy Controls

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Background & Aims:

- Trauma is a common cause of recurrent corneal erosion (RCE), but not all eyes develop RCE after trauma.
- **Hypothesis**: Is there a predisposition in such patients?
- **Aim**: **To assess corneal epithelial thickness (ET) changes in affected and fellow eyes of patients with post-traumatic recurrent corneal erosions (RCE) and compare these with healthy age-matched controls.**

Materials & Methods:

- Single-centre **observational** study **including** patients with traumatic RCE (& **excluding** corneal dystrophies).
- **Epithelial thickness (ET) maps** obtained at FU visit (when erosion had healed) for **affected eyes** (**Group 1**) and **fellow eyes** (**Group 2**) and also for healthy age-matched **control eyes** (**Group 3**).
- Parameters studied (**Figure 1**): **E2.0**: Epithelial thickness in central 2 mm; **E-S (2-7mm):** ET in superior cornea (2 - 7mm zone); **E-I (2-7mm):** ET in inferior cornea (2 - 7mm zone); **E-Min:** Minimum ET; **E-Max:** Maximum ET; **E-Std Dev:** Parameter indicating variation in ET; **E(Min-Max):** Difference b/w minimum & maximum ET; **Qualitative map assessment**: performed by analysing number of zones with ET 60-70 µ and 70-80 µ.
- **Primary outcome measure**: Comparison of '**E-Std Dev**'
- **Secondary outcome measures**: Comparison of all other parameters.

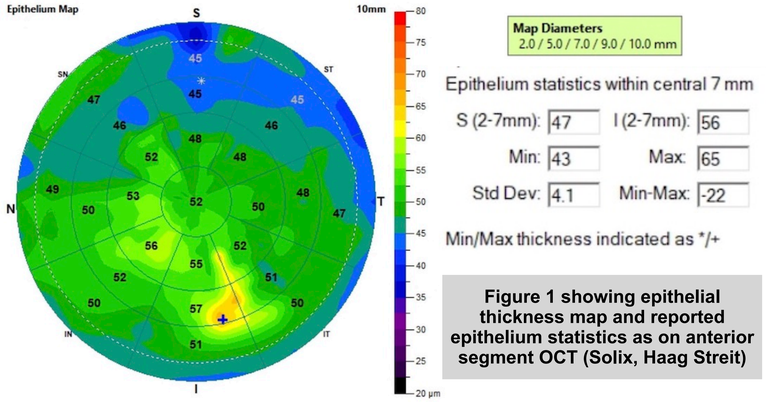


Figure 1 showing epithelial thickness map and reported epithelium statistics as on anterior segment OCT (Solix, Haag Streit)

Parameter	Group 1 (affected eyes, n=33)	Group 2 (fellow eyes, n=33)	Group 3 (control eyes, n=33)	P value (ANOVA)
Age (years)	50.8 ±15.3	50.8 ±15.3	45.88 ± 15.43	0.21
E-Std Dev (µ)	4.65 ± 1.87	2.92 ± 1.16	1.94 ± 0.63	**<0.01**
E2.0 or CET (µ)	57.24 ± 7.13	54.58 ± 4.33	52.79 ± 3.36	**0.01**
E-S (2-7mm) (µ)	49.94 ± 6.59	50.42 ± 3.91	51.39 ± 2.42	0.45
E-I (2-7mm) (µ)	55.97 ± 9.99	55.76 ± 9.02	54.36 ± 2.78	0.68
E-Min (µ)	43.58 ± 10.44	46.33 ± 6.00	48.03 ± 3.85	0.05
E-Max (µ)	66.55 ± 11.41	62.54 ± 9.54	57.21 ± 3.17	**<0.01**
E(Min-Max) (µ)	-17.61 ± 19.40	-14.48 ± 9.51	-9.21 ± 3.01	**0.03**
Zones 60-70 (no.)	5.64 ± 3.42	3.61 ± 2.99	0.27 ± 0.71	**<0.01**
Zones >70 (no.)	3.48 ± 2.84	1.30 ± 1.88	0.03 ± 0.17	**<0.01**

Table 1: Summary of results of corneal epithelial mapping parameters in the three study groups and comparison.

Results:

- 33 patients & 33 age-matched healthy controls included (**Table 1**).
- **E-Std Dev**: highest values in Group 1 & lowest in Group 3 (**P<0.01**).
- Similar trend also noted for **central ET (P<0.01), maximum ET (P<0.01), E(min-max) values (P=0.03)** and **qualitative map assessment (P<0.01).**

Discussion

- **Variation in epithelial thickness:** highest in affected eyes, followed by fellow eyes and least in the control eyes - supports **hypothesis of predisposition to RCE**.
- Similar trend for qualitative assessment and maximum ET values.
- **Clinical implications** - role of prophylactic lubrication?
- **Limitations**:
  1. Observational study & retrospective data collection
  2. Did not objectively score dry eye
  3. Selection bias for controls cannot be ruled out.
- **To conclude,** our results of corneal epithelial mapping changes in patients with traumatic RCE highlight sub-clinical changes in fellow eyes which may help identify **at-risk "forme fruste"** eyes.

References:

1. Das S *et al*. Recurrent corneal erosion syndrome. Surv Ophthalmol. 2007
2. Abtahi M-A *et al*. Corneal Epithelial Thickness Mapping: A Major Review. J Ophthalmol. 2024

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