

# Simultaneous Ocular Wavefront-guided TransPRK and CXL for Keratoconus: A Prospective study

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Vijay Anand  
Daniel M Gore  
Marcello Leucci  
Bruce D Allan

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## Study Objective

To investigate the visual benefits in progressive keratoconus with irregular astigmatism treated with combined CXL and ocular wavefront-guided transPRK targeting higher order aberrations (HOA) only.

## Methodology I

- Prospective case series
  - Primary outcome measure
    - LogMAR CDVA at 12 months
  - Secondary outcome measure
    - Failure rate
    - Rate of infective keratitis
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## Methodology II

### Inclusion criteria

- Patients with progressive stage I - III keratoconus
- CDVA < 0.00 logMAR

### Exclusion criteria

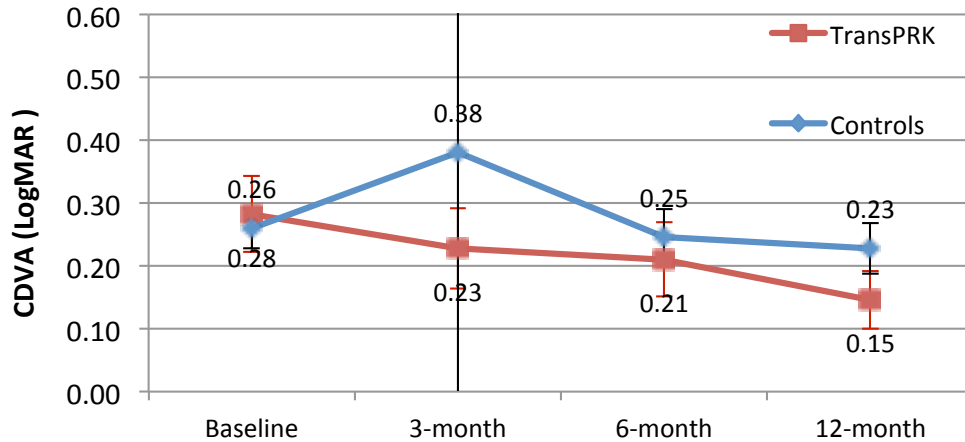
- Patients < 18 years
- Active ocular surface disease
- Minimum corneal thickness <390 $\mu$ m (leaving 325 $\mu$ m residual stromal thickness after transPTK)
- Vulnerable groups

## Surgery

- OWF-guided ablation (Schwind Amaris 750s)
- No Mitomycin-C was used
- Only HOAs treated to minimise ablation depth (all spherocylindrical constraints removed)
- Accelerated CXL (Avedro) followed immediately after TransPRK
  - 30 mW/cm<sup>2</sup> for 4 minutes (pulsed every 1.5 seconds)
  - Total energy 7.2 mJ/cm<sup>2</sup>)

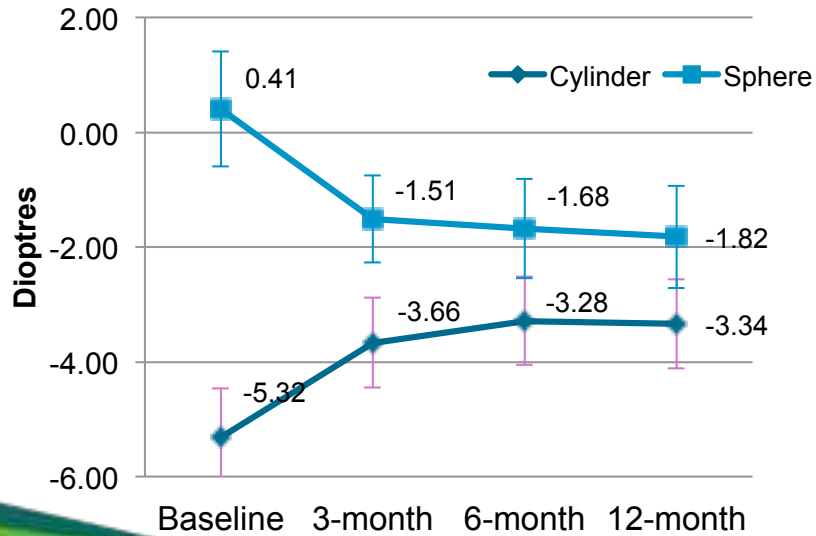
# Results

Change in visual acuity (95% CI error bars) - OWF only

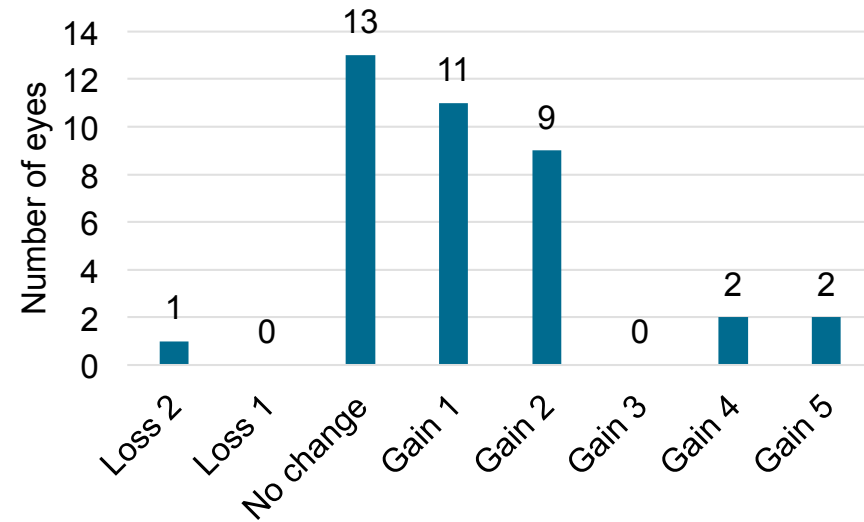


- 46 eyes (46 patients) treated with OWF-guided transPRK & CXL
- 42 reached 12-months follow-up
- 1 eye lost vision due to haze
- 13 (30 %) gained 2 or more lines of CDVA

Mean manifest refraction (95% CI error bars)



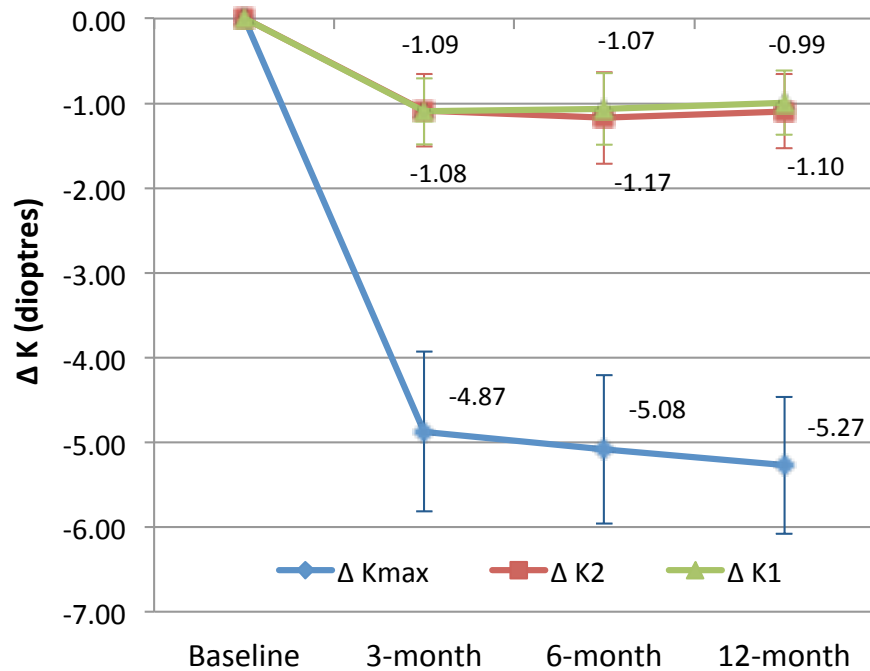
Lines of vision gained and lost at 12-months



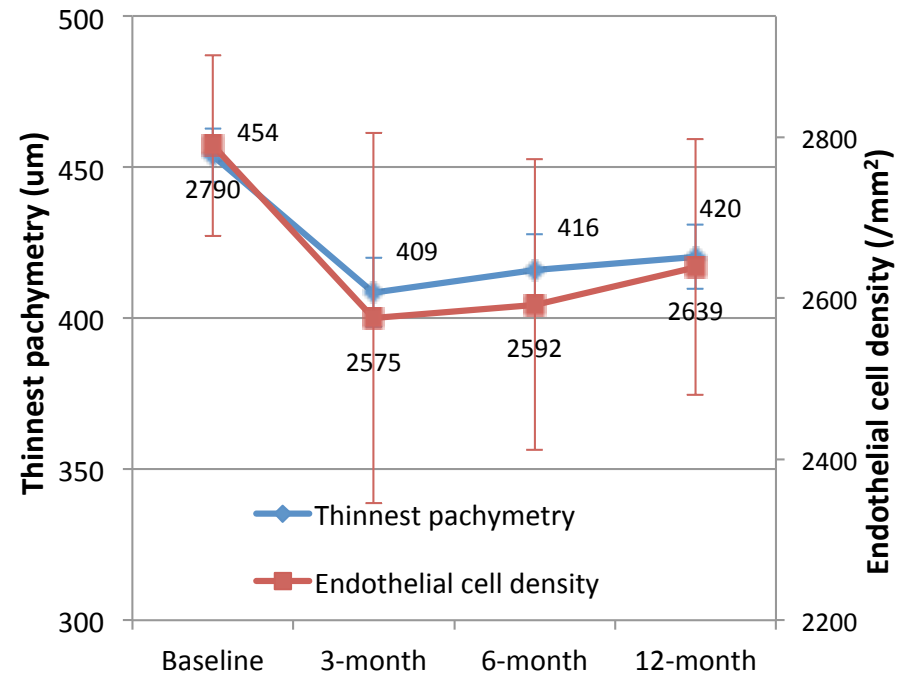
# Results

- Mean cone ablation depth 30.3µm (SD 10.6)
- No eyes progressed during the study period
- One (2%) eye developed microbial keratitis, only returning for bandage contact lens removal at 3 weeks (CDVA unchanged in this eye)

Change in anterior keratometry (95% CI error bars)



Changes in pachymetry and specular microscopy



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## Conclusion

Combined transPRK and CXL improves corrected spectacle acuity and effectively stabilises progressive keratoconus