

Corneal Imaging and Densitometry Measurements in Juvenile Keratoconus Patients to Monitor Disease Progression and Treatment Outcomes after Corneal Cross-Linking

Khaled Alzahrani¹, Fiona Carley², Susmito Biswas², Debbie Morley², M. Chantal Hillarby¹

¹Division of Pharmacy and Optometry, School of Health Sciences, University of Manchester and

²Manchester Royal Eye Hospital, Manchester, UK

Conflict of interest

KA none. FC none. AB none .DM none. CH none.

Background

Corneal cross-linking (CLX) is becoming the treatment of choice in paediatric keratoconus, however, there are reports that corneal thinning can reoccur after 12 months in these patients. The outcome of CXL in adult keratoconus has been studied in depth, but less is known about the outcome in younger patients.

Aims

Densitometry software for the Oculus Pentacam was used to investigate corneal clarity post CXL in juvenile keratoconus patients.

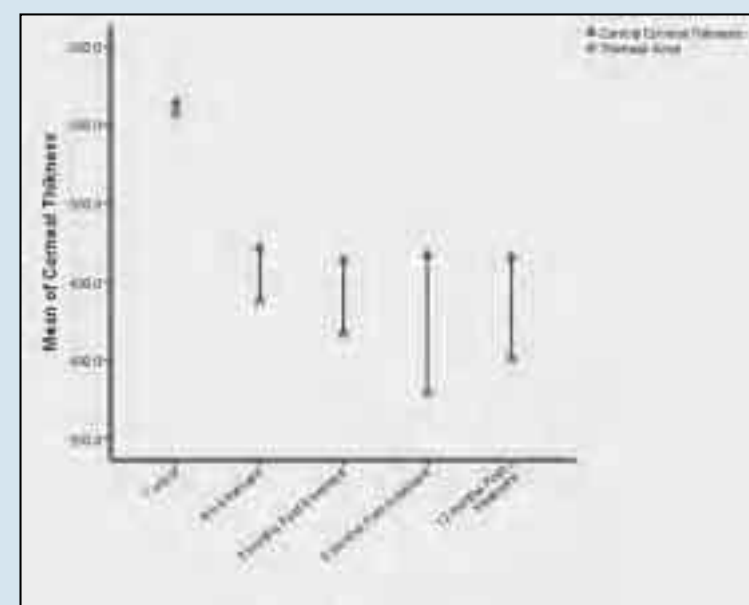
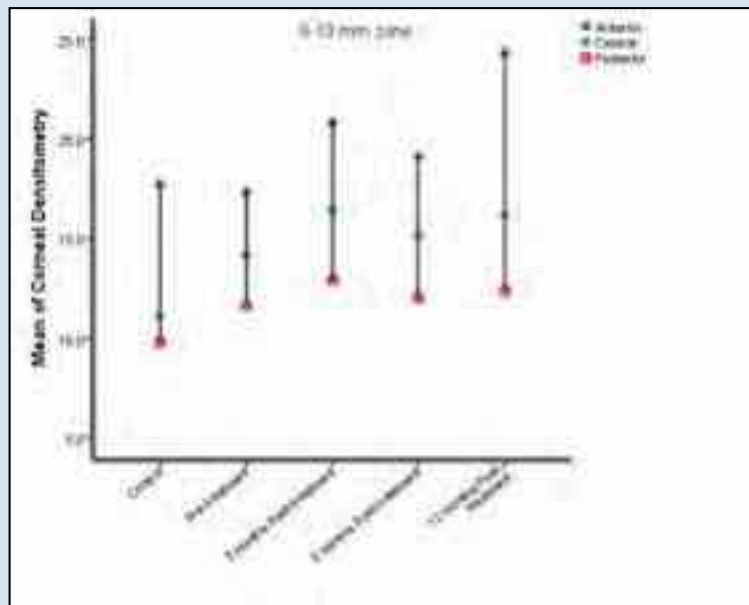
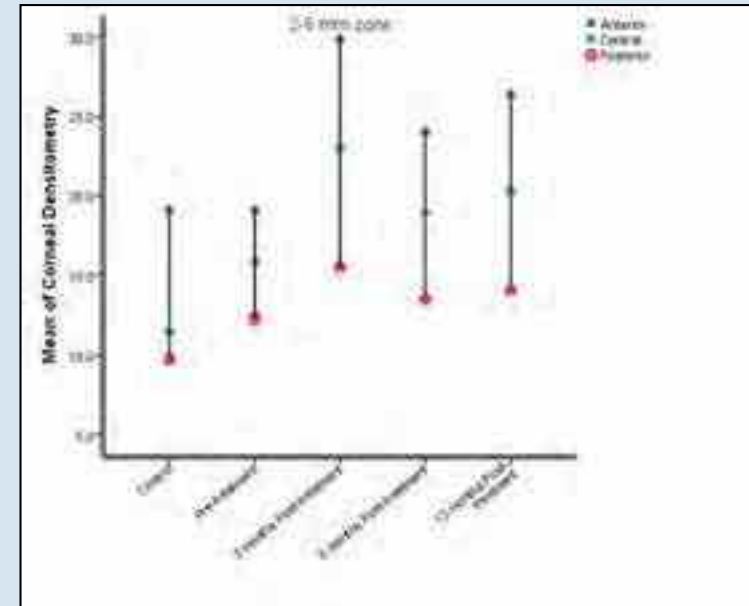
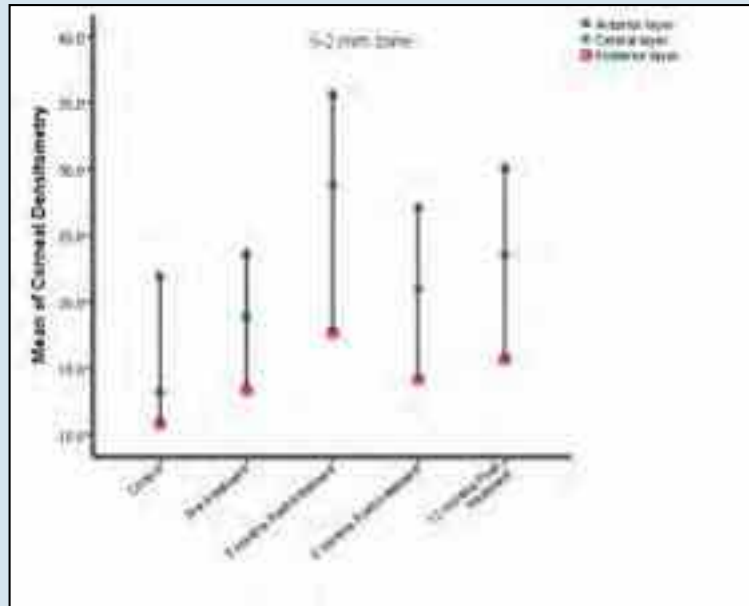
Methods

- A retrospective comparative study was carried out at the Manchester Royal Eye Hospital.
- Corneal densitometry measurements collected before and after CXL treatment for 9 eyes from KC patients, aged between 13 and 18, were analyzed and compared to corneal densitometry of 40 corneas from age matched healthy volunteers.
- Densitometry measurements were taken before and after treatment and followed up for one year (3, 6 and 12 months post treatment).
- Comparisons were made for different corneal layers and zones.

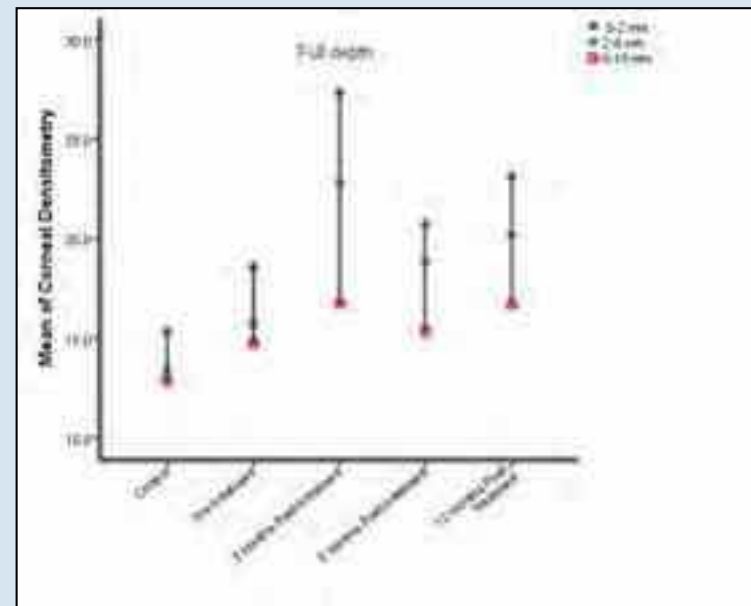
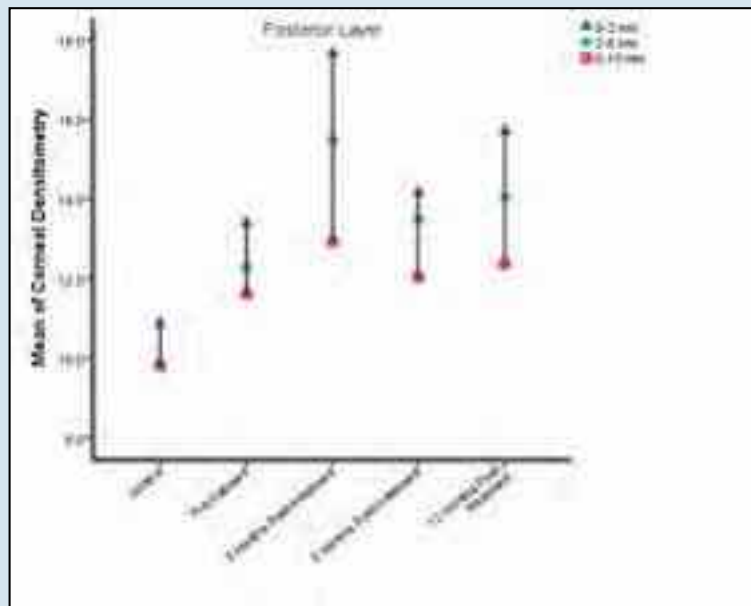
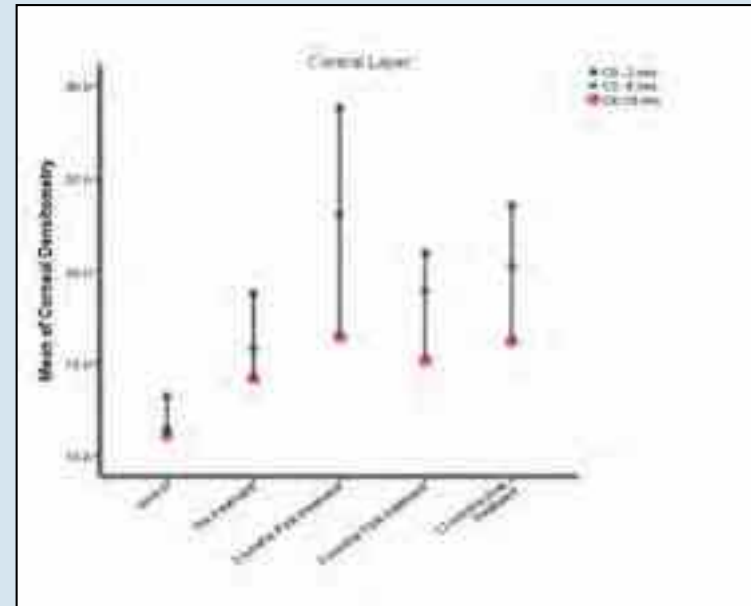
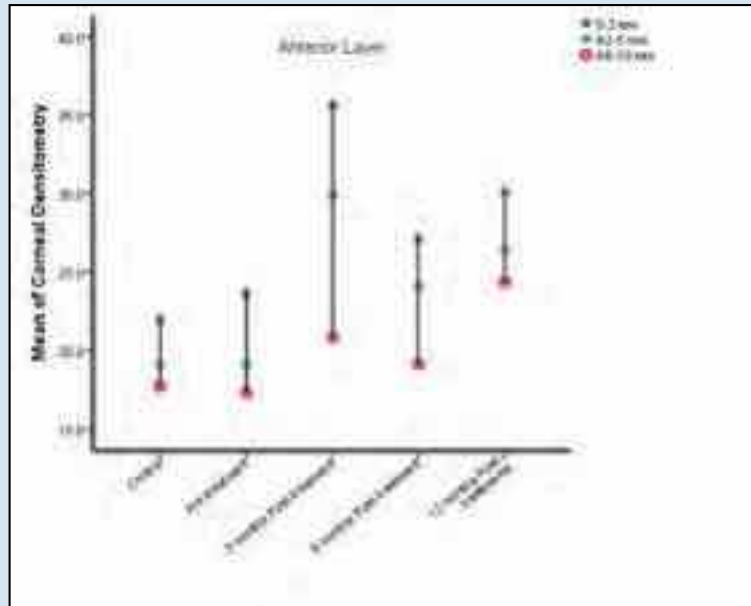
Results

- Analysis of densitometry measurements found higher corneal densitometry after CXL which reaching the highest level at three months post-treatment.
- There was significant diversity in corneal densitometry measurements at full thickness in the area of (0-2 mm, 2-6mm and 0-10mm) between control and KC patients, both treated and untreated ($p < 0.05$).
- Significant differences were found between pre-treatment and post-treatment at three, six and twelve months at full thickness of 0-2 mm and 2-6 mm area zone ($p < 0.05$).
- However, no significant difference was found between pre and post-treatment, at full thickness zone of 6-10mm and 0-10 mm.

Densitometry measurements in concentric zones



Densitometry measurements in corneal layers



Conclusion

- There were different outcomes in the corneal densitometry measurement after CXL depending on the area measured.
- As expected corneal zones of 0-2 mm and 2-6 mm were found to be the most affected area post treatment. However, when the layers of the cornea were examined the posterior layer showed similar increases in haze after treatment, which is unexpected as the UV should not penetrate down to the posterior.
- Corneal haze reached its maximum level at three months after treatment then appears to improve at six months before it is picked up again at one year.
- Oculus Pentacam provides an objective evaluation to monitor the cornea status after the treatment



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Contact Email: khaled.alzahrani@postgrad.manchester.ac.uk