Sir,
Corneal cross-linking service survey in England

Corneal cross-linking (CXL) describes a procedure whereby topical riboflavin is combined with ultraviolet (UV) light exposure to stabilize corneal ectasias such as keratoconus. Treatment for keratoconus up to now has been supportive only, and as such clinical interest in the procedure is high. Supportive evidence exists in large case series,^{1–3} small RTCs³ and large RCTs are underway^{4,5} but CXL does not yet have full NICE approval. The aim of our survey was to get an overview of current provision of CXL in England.

The Royal College of Ophthalmologists provided a list of corneal consultants, which was cross-checked by telephoning all hospitals in the ophthalmic directory. An online survey was created and sent electronically to all (Figure 1).

Out of the 115 Ophthalmology units in England, 98 offer a corneal service. The survey response rate was 42% (41 out of 98 units). Of those that responded, 32% currently offer CXL: 10% under the NHS, 12% privately, and 10% both privately and under the NHS. The reported average number of patients being treated is eight per quarter. The reported average length of time CXL has been offered for is 2 years, with NHS

Corneal Cross Linking Service Survey in England.

*** 1. Are you a consultant with a corneal interest?**

- ☐ Yes
☐ No

*** 2. Do you currently offer cross-linking to patients with corneal ectasias?**

- ☐ Yes - NHS and Privately
☐ Yes - NHS only
☐ Yes - Privately only
☐ No

*** 3. If not, are you planning to set up a corneal cross-linking service in the near future?**

- ☐ Yes
☐ No
☐ N/A

This is the end of the questionnaire for those who answered 'No' to question 2. If you have answered 'Yes' to question 2 please carry on with the rest of the questionnaire.

4. If cross-linking, for how long have you been offering this service?

Number of years

5. Approximately to how many patients per quarter have you offered the treatment to?

Number of patients/quarter

6. Which method of corneal cross-linking do you use?

- ☐ Rapid CXL (please specify)
☐ Standard CXL

Please specify the type of rapid corneal cross-linking you offer

7. Which method of riboflavin infusion do you use?

- ☐ Transepithelial
☐ Remove the epithelium

8. If you work across more than one NHS site, please specify where you offer cross-linking.

Figure 1. Eight question online survey sent to all corneal consultants in England.

CXL being offered on average for a year longer than privately.

Regarding units not currently offering CXL, the majority (64%) plan to initiate services in the near future.

Rapid CXL, in which UV power is increased and exposure time reduced, is used by 54% whereas 46% used standard CXL (all consultants offering CXL only under the NHS only use standard CXL). Lastly, 77% infuse riboflavin after removing the epithelium, 8% use transepithelial riboflavin infusion and 15% use both methods.

In summary, CXL is becoming more commonly available with the majority of departments planning to initiate services. Rapid CXL is becoming the favoured choice; however, the majority still remove the corneal epithelium. The NHS Commissioning Board has added CXL service to its consultation for specialized commissioning. Hence, CXL will probably be limited to specialist centres.

Online surveys are easily applied and useful in gauging a snapshot of opinion, but must be used with caution because of difficulty in responses subgroup analysis.

Conflict of interest

The authors declare no conflict of interest.

References

- 1 Raiskup-Wolf F, Hoyer A, Spoerl E, Pillunat LE. Collagen crosslinking with riboflavin and ultraviolet-A light in keratoconus: long-term results. *J Cataract Refract Surg* 2008; **34**(5): 796–801.
- 2 Caporossi A, Mazzotta C, Baiocchi S, Caporossi T. Long-term results of riboflavin ultraviolet a corneal collagen cross-linking for keratoconus in Italy: the Siena eye cross study. *Am J Ophthalmol* 2010; **149**(4): 585–593.
- 3 O'Brart D, Chan E, Samaras K, Patel P, Shah SP. A randomised, prospective study to investigate the efficacy of riboflavin/ultraviolet A (370 nm) corneal collagen cross-linkage to halt the progression of keratoconus. *Br J Ophthalmol* 2011; **95**(11): 1519–1524.
- 4 Wittig-Silva C, Whiting M, Lamoureux E, Lindsay RG, Sullivan LJ, Snibson GR. A randomized controlled trial of corneal collagen cross-linking in progressive keratoconus: preliminary results. *J Refract Surg* 2008; **24**(7): S720–S725.
- 5 Hersh PS, Greenstein SA, Fry KL. Corneal collagen-crosslinking for keratoconus and corneal ectasias: one year results. *J Cataract Refract Surg* 2011; **37**(1): 149–160.

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Sir,

Potential effect of 'cut-off intensity' on correlation between light meter measurements and time outdoors

The study by Dharani *et al.*¹ represents a very informative comparison between objective light meter measurements and the more subjective diary monitoring of time spent outdoors, both of which have implications for myopia. They found a poor to fair correlation. They reasonably used a cut-off value of >1000 Lux to compare light meter measurements with time spent outdoors, as this was similar to cut-offs in previous studies. If they had used a higher cut-off (which might be justifiable as their pilot test revealed that being indoors with a stream of bright sunlight could yield means of 1573 and 4445 Lux), then this could lower the values for the light meter measurements in their Table 1, which would bring them closer to the diary measurements of time outdoors, and could potentially affect the strength of the correlation. Thus, it would be useful to calculate means and test correlation with different cut-off values, or even to test the strength of the correlation between the raw total light meter measurements and time outdoors.

Also, they excluded days on which all intensity readings were consistently <100 Lux, as this implied the light meter was not worn. It would be useful to know how many days were excluded as a result. If it were the case, for example, that the light meter was more likely to be left at home on days when children were spending more time outdoors, which is potentially plausible, then this would suggest that the overall measurements underestimate light exposure and outdoor activity. The authors could compare the outdoor diary for these days to investigate this hypothesis. Such an effect would of course be small if very few days were excluded.

Conflict of interest

The authors declare no conflict of interest.

Reference

- 1 Dharani R, Lee CF, Theng ZX, Drury VB, Ngo C, Sandar M *et al.* Comparison of measurements of time outdoors and light levels as risk factors for myopia in young Singapore children. *Eye (Lond)* 2012; **26**(7): 911–918.