

Evaluation of Soft Contact Lens Performance Using the Contrast Sensitivity Function

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Introduction

The contrast sensitivity function (CSF) has been widely accepted as a measure of visual performance.¹ Its use as a diagnostic tool in contact lens work has been documented.^{1,2,3} Typically, the CSF has been used for the patient who presented with a complaint of blurred vision while wearing hydrogel contact lenses. Snellen visual acuity testing indicated little, or no decrease in vision. The contrast sensitivity test on the other hand, indicates a reduction in visual performance. Studies have shown that this reduction is usually due to a small residual refractive error, or to deposits on the lens.^{1,4,5} It sometimes happens that patients who have been wearing soft contact lenses successfully for some years require a new lens. Upon delivery of the new lens the patient does not achieve the expected performance.

Case Report

This is a report of a patient (D.B.) who had been wearing soft contact lenses successfully for five years. The most recent set of lenses had been fitted approximately one year ago. Her spectacle correction was -3.25 D.S. in each eye. The lenses were lost and new lenses of the same parameters were ordered. When the replacement lenses were delivered, Snellen visual acuity was the same in both eyes. The lenses were fitting properly, and the over-refraction was plano in each eye. The quality of the lenses appeared to be good. Within days D.B. informed us that her vision was blurred with her right eye. Since she was wearing identical lenses in each eye, she was instructed to wear the lenses on the opposite eyes. The difficulty was now transferred to D.E.'s left eye. It was suspected that the lens might be defective, but careful examination revealed no flaws. A replacement lens was ordered. The new lens gave similar results. At this point both patient and optometrist were frustrated. D.B. was refitted with a different type of hydrogel lens. With this set of lenses, equal vision was achieved both clinically, and from the patients' point of view.

Clinically, a problem still remained. How does one determine the effectiveness of a hydrogel lens when conventional testing is inconclusive? In this case contrast sensitivity testing proved to be helpful. CSF results, using the Vistech system, were compared with spectacles, with the set of lenses (A) with which she was experiencing monocular difficulty, and with the newer lenses (B). For the CSF testing D.B. wore the lens in question on her left eye. The results obtained are shown in Figures 1 and 2.

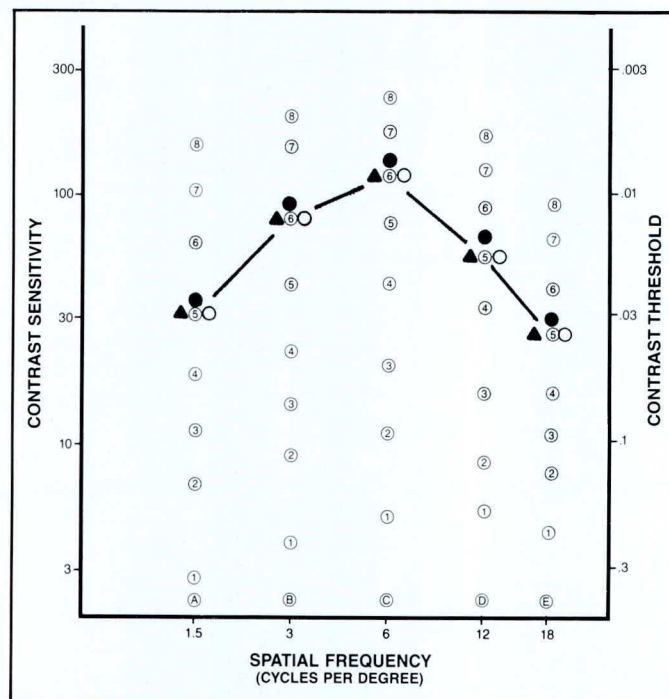


FIGURE 1

- ● — SPECTACLES
- ▲ — LENS A
- ○ — LENS B

RIGHT EYE

Discussion

The results indicate a reduction in visual performance when wearing the lens in question. This reduction was only in the higher frequency end of the CSF. Reductions in the higher frequency portion of the CSF are indicative of a refractive, or optical problem of the eye, or of the lens being worn.^{3,5} Since measurement showed that the refractive power was correct, it was assumed, that the optical properties of the individual lens must not have been as good as the other lens.

Conclusion

Contrast sensitivity testing is being used to assist in the selection of the type of contact lens to be prescribed.¹ It is also used to determine if a patient is a good prospect for contact lens wear. In this particular case, it helped me to determine the optical performance of an individual hydrogel contact lens, where other test procedures provided inconclusive results.

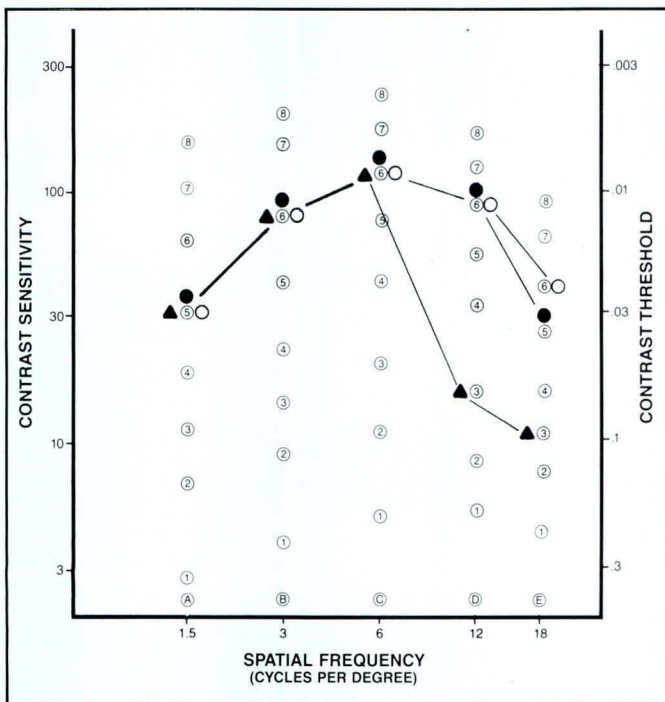


FIGURE 2

— ● — SPECTACLES
 — ▲ — LENS A
 — ○ — LENS B

LEFT EYE

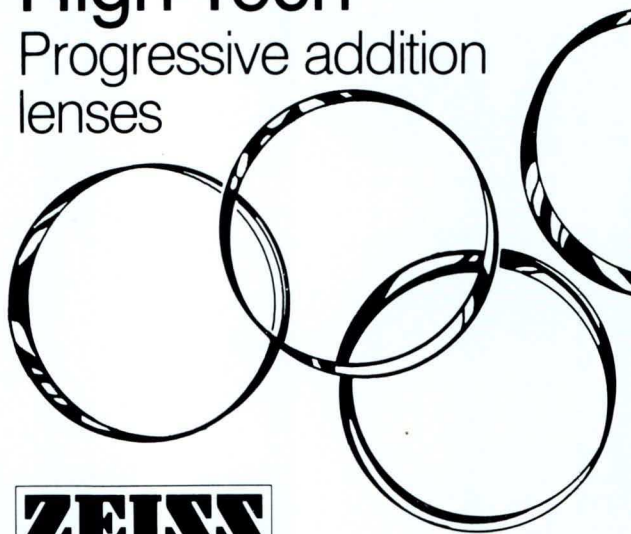
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