

Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Pupil diameter, working distance and illumination during habitual tasks. Implications for simultaneous vision contact lenses for presbyopia

December 13, 2017



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Simultaneous vision contact lenses for presbyopia are designed to focus light from objects at different distances onto the retina at the same time. While high contrast vision is often maintained with this design of lens, overall patient satisfaction with vision can vary. It is understood that pupil size, illumination and working distance all contribute to the visual performance of this type of contact lens.

Cardona G, Lopez S. Pupil diameter, working distance and illumination during habitual tasks. Implications for simultaneous vision contact lenses for presbyopia. J Optom. 2016; 9: 78-84.

The aim of this study was to determine the pupil diameter, illumination level and working distance for a group of presbyopic participants while they conducted habitual tasks in their everyday life. In-office measures of pupil diameter were also measured and compared to 'real-life' pupil size.

A total of 59 participants (45-63 years) were involved in the study. Participants involved in different types of work (e.g. clerical, education, management) were included, to provide a representative sample of habitual visual tasks in this age group. Following an initial interview about their daily habitual visual tasks, in-office pupil measures were completed under both photopic and mesopic conditions. Pupil diameter, illumination and working distance were then captured as participants completed habitual near vision tasks at home or in their workplace.

The results showed that computer use, reading, sewing and sports were the most common tasks undertaken in this group of individuals over the course of their normal day. Completion of the same task, for example viewing a computer screen, resulted in high inter-subject variability for all three of the parameters measured (pupil size, illumination and working distance). The difference in pupil size when completing habitual tasks and the in-office measures were significantly different.

The conclusion of this study recognises the individual nature of patient's visual tasks, light levels and working distances. It also recognises that measures of pupil diameter vary significantly from in-office to real-world situations. Remembering that pupil size affects visual performance with simultaneous vision multifocal contact lenses, the variation found in this study led the authors to advise eye care practitioners to assess pupil diameter in real life situations when they are deciding on the multifocal lens design and power they wish to fit.

While it may be impractical to replicate the same methodology in the real-world, the study highlights the variation of conditions under which multifocal contact lenses are expected to perform. Most relevant for the practitioner, this

study reminds us to pay attention to the patient's lifestyle, near vision demands and pupil size, whilst also keeping in mind that any measurements taken in-office may differ in the real-world. For the practitioner, the study provides useful evidence to explain why the patient may experience different performance from their lenses once they leave their eye doctor's office.