Effect of mesopic/scotopic luminance on pupil diameter and anisocoria in drivers over 65 years of age

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PURPOSE

The binocular measurement of pupil diameter presents the patient’s life conditions with more accuracy. Therefore, in eyes with a large pupil diameter, with the risk of postoperative scotopic phenomena, should be considered the binocular pupil size measurement before refractive surgery.

The aim of our study was to evaluate the changes produced in pupil diameter and anisocoria in mesopic and scotopic conditions in subjects over the age of 65 years.

METHODS

A prospective evaluation was performed of binocular pupil diameter in 45 motor car drivers aged 60 to 80 years (71.5 years).

Measurements were made using the pupillometer P2000 (Prucyn Instruments Ltd, London, UK) which use a computerized technique allows dynamic and binocular measurement of the pupil diameter by use of infrared light at 3 luminance levels: 0.04 lux (scotopic), 0.4 lux (low mesopic) and 4 lux (high mesopic). For each measurement, 10 photographs of both eyes are automatically taken by the instrument.

RESULTS

Figure 2 shows the mean pupil diameters in the three luminance conditions. In scotopic conditions, mean pupil sizes were RE 5.37±1.1 mm, LE 5.29±1.1 mm.

When the luminance level was increased to 0.4 lux (low mesopic) mismatches of 18% and 17%, respectively for the right and left eyes, were observed, resulting in pupil diameters of RE 4.5±0.83 mm, LE 4.5±0.78 mm.

In high mesopic conditions (4 lux), pupil diameters were RE 3.4±0.89 mm, LE 3.4±0.89 mm, corresponding to mismatches from the previous luminance level of 28% and 29%, respectively. The differences in pupil diameter among the three luminance levels were significant. No differences attributable to the luminance level were detected between each eye.

The degrees of anisocoria obtained were 5.77%, 5.78% and 5.77% in scotopic, low and high mesopic conditions, respectively.

CONCLUSIONS

At scotopic and mesopic luminance levels, drivers over 65 years show significant differences in pupil diameter but no changes in anisocoria.

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REFERENCES