

## IMPACTS OF INDUCED MONOCULAR BLUR ON VISUAL FUNCTIONS

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### ABSTRACT

Anisometropia relates to the differences in refractive power between both eyes. Hence, anisometropia is expected to have deleterious effects on visual functions due to dissimilar retinal images formed on both eyes. This study explored the outcome of induced blur in terms of a refractive defocus on visual functions. Imposing different levels of blur was believed to mimic the anisometropia condition. Twenty emmetropic adults enrolled in this study. Myopia, hyperopia and astigmatism were induced using soft contact lenses in steps of 1.0 Dioptre (D) ranging from 1.00DS until 4.00DS as well soft toric contact lenses 1.00DC until 4.00DC (with the rule (WTR). Visual acuity (Standard logMAR), contrast sensitivity (Pelli Robson), stereoacuity (TNO stereotest) and aniseikonia (retinal image sizes) (Smart Optometry application) were assessed at baseline and each level of defocus. **Results:** All myopic, hyperopic and astigmatic anisometropia resulted in significant deterioration of visual acuity, and stereoacuity at all level refractive defocuses ( $p < 0.05$ ). With a maximal of 4D anisometropia magnitude, visual acuity in myopic and hyperopic anisometropia reduced by 9 lines and 5 lines for astigmatic anisometropia. Contrast sensitivity remained steady throughout all level of defocuses in all mimicked anisometropia groups. The stereoacuity was lost among the 4D magnitude of myopic and hyperopic anisometropia while astigmatic anisometropia retained the stereoacuity. Highest slope value obtained from linear regression of stereoacuity for each myopic, hyperopic and astigmatic anisometropia (slope value of 0.33, 0.30 and 0.26) respectively corresponding with logMAR acuity and contrast sensitivity. Aniseikonia also was significant in all anisometropia groups ( $p < 0.05$ ). Mimicked myopic anisometropia experienced aniseikonia at each magnitude of anisometropia but, the cut off magnitude for hyperopic and WTR astigmatic anisometropia were 3D. **Conclusion:** Small amount of anisometropia was accountable in affecting visual functions. Even at the low magnitude of mimicked myopic anisometropia, stereoacuity affected the most as compared to visual acuity and contrast sensitivity, thus contributing to the high prevalence of anisometropic amblyopia.

**Keywords:** Monocular defocus, mimicked anisometropia, visual function, binocular function

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