Characteristics of Astigmatism as a Function of Age in a Hong Kong Chinese Clinical Population

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Purpose:
Astigmatism is a very common refractive error constantly affecting unaided vision regardless of changing in viewing distance or accommodation. While a few studies have reported the prevalence of astigmatism in Hong Kong Chinese populations, they were either small in scale or focused only on a limited age cohorts. This study aims to characterize astigmatism as a function of age in a Hong Kong Chinese clinical population.

Methods:
All clinical records during 2007 at the Optometry Clinic of The Hong Kong Polytechnic University were used. Only subjects with aided visual acuity better than 6/9 in both eyes and completed subjective refraction were analyzed. The data was subdivided into seven cohorts by age (i.e., ≤10 yrs, 11-20yrs, ⋯, >60yrs). For statistical analyses, refractive errors were decomposed into spherical-equivalent refractive error (SE), J0 and J45 astigmatic components using Fourier analyses. Internal astigmatism was calculated by subtracting corneal astigmatism from refractive astigmatism.

Results:
Of the 1474 cases that fulfilled our selection criteria, 60.5% and 28.0% had myopia (SE ≤-0.75D) and refractive astigmatism (Cyl ≥1.00D), respectively. The prevalence of myopia increased from 22.1% in children (≤10 yrs) to 78.3% in young adults (21-30 yrs), and dipped to 32.8% in the elderly (>60 yrs). Likewise, the prevalence of astigmatism increased from 20.8% in children to 36.8% in young adults but remained high in elderly (38.4%). Among the astigmats, 92.1% of children had WTR but 83.8% of the elderly had ATR astigmatism. As a group, refractive astigmatism was more strongly correlated with corneal (Cyl: $r^2=0.42$; J0: $r^2=0.62$; J45: $r^2=0.31$; all ps<0.001) than with internal astigmatism (Cyl: $r^2=0.20$; J0: $r^2=0.14$; J45: $r^2=0.17$; all ps<0.001). More importantly, unlike the J0 component of internal astigmatism, which was fairly stable across the age groups, the J0 components of both corneal and refractive astigmatism reduced with age.

Conclusions:
In this Hong Kong Chinese clinical population, the changes in astigmatism as a function of age were mainly corneal in nature. Further studies are needed to characterize the corneal biometric properties in relation to the genesis of astigmatism with age.