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Inter-eye asymmetry in corneal topography and classification of corneal astigmatism

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Abstract

Purpose : Variations in corneal curvature and astigmatism influence contact lens fit and vision. This study explores inter-eye asymmetry in corneal shape, with respect to sex, in a healthy, young adult population. We investigated central corneal curvature, corneal astigmatism (magnitude and classification).

Methods : Both eyes from 123 volunteers (mean age 21.3 ± 2.7 years, 53 males and 70 females), without a history of ocular disease, were recruited. Ethnic distribution was 65% South Asian and 35% European whites. Using the Aladdin topographer (Topcon, Tokyo, Japan), corneal radius of curvature was recorded for the flat and steep meridians of both eyes. Corneal astigmatism (CA) was calculated as the difference in keratometry values in dioptres (D). Corneal astigmatism was also classified as with the rule (WTR), oblique, or against the rule (ATR).

Results : There were no significant inter-eye differences for corneal values or astigmatism ($P>0.42$ all cases). Between-sex comparisons showed statistically significant differences for the orthogonal meridians whereby males presented flatter corneas compared to females (mean difference 0.13 mm; CI: 0.05 to 0.23; $P<0.01$). There were no significant differences between the eyes of males and females for any of the other corneal topography parameters ($P>0.05$). The percentage proportion of the classification of CA in the right eye

(WTR/oblique/ATR) was similar between males and females: 68/29/3 compared to 75/22/3, respectively (*P*=0.32). Oblique astigmatism was not associated with ethnicity (*P*=0.65).

Conclusions : Similar to previous reports, we found that flatter corneal curvature differs between males and females. Oblique astigmatism was present in 25% of our total study population, which is a higher proportion than reported in white and Asian eyes (1 to 16%). This could possibly be explained by our large sample of South Asian eyes. Variations in corneal curvatures between genders and presentation of oblique astigmatism in a relatively young population are important as they may affect lens centration and influence contact lens choice.

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