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Editorial

Improvement in Corneal Assessment by Curved-field OCT

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Clinical procedures, such as refractive surgeries, depend on the counts of corneal cells and their nerves placed at en face corneal planes and consequently need en face corneal images with a large field-of-view [1]. However, the field-of-view of current high-resolution clinical methods, such as *in vivo* confocal microscopy (IVCM) and specular microscopy (SM), is optically restricted to about 0.5 mm [1,2]. Emerging *in vivo* research instruments derived from conventional Fourier-domain optical coherence tomography (OCT), such as ultrahigh-resolution-OCT (UHR-OCT) [3,4], Gabor-domain optical coherence microscopy (GDOCM) [5], and micro-OCT (μOCT) [6] can amplify the field-of-view up to about 1 mm; however, the cellular mosaics at that level are free of motion artifacts only in anaesthetized humans and animals, immobilized throughout the prolonged laser beam scanning in the en face plane [2].

Therefore, new methods are required to address these limitations. Curved-field optical coherence tomography (CF-OCT), which can capture optical sections of arbitrary curvature, has recently been introduced [2]. Amazingly, this method was demonstrated to allow full-field views of the curved sub-basal nerve plexus (SNP) and corneal endothelial layers at 1.13 mm × 1.13 mm and beyond when it was employed to the *in vivo* human cornea [2]. A high en face imaging speed of CF-OCT (0.6 billion pixels/s) guarantees that images are free of eye or head movement artifacts [2]. Astonishingly, CF-OCT is a noncontact method that takes 3.5 milliseconds to accomplish [2]. Apart from ophthalmic imaging, CF-OCT can be useful for non-contact examination of a range of *in vivo* as well as ex vivo human and animal tissues that exhibit a curved structure [2].

Large-field views of the SNP, gained in a non-contact manner by CF-OCT, open a pathway for simple and accurate supervision of the progression of diabetes, known to alter the corneal nerve density and tortuosity [2]. Furthermore, since larger views of the corneal endothelial cell mosaic are captured by this method, it is anticipated to advance the results of corneal transplantation and cataract surgeries [2]. This is due to the fact that the corneal endothelial health and a minimal corneal cell count are important factors when corneal transplantation and cataract surgeries are presently performed [1]. Large field-of-view also lessens the chance of missing the disease-affected region [1,2]. It also enhances the precision of corneal cell counts, improving diagnosis in an assortment of ocular diseases, such as Fuchs' dystrophy, endothelial trauma, iridocorneal endothelial syndrome, and keratoconus [1,2].

In conclusion, improvement in corneal assessment using CF-OCT offers better results in the management of many eye diseases known to involve the cornea. In addition, it improves corneal assessments before and after corneal transplantation and cataract surgeries.

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Conflict of Interest

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Author Contribution

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