

# PUBLISHED VERSION

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## **Corneal deformation dynamics are associated with the retinal nerve fiber layer progression rate in glaucoma suspects and early manifest glaucoma patients**

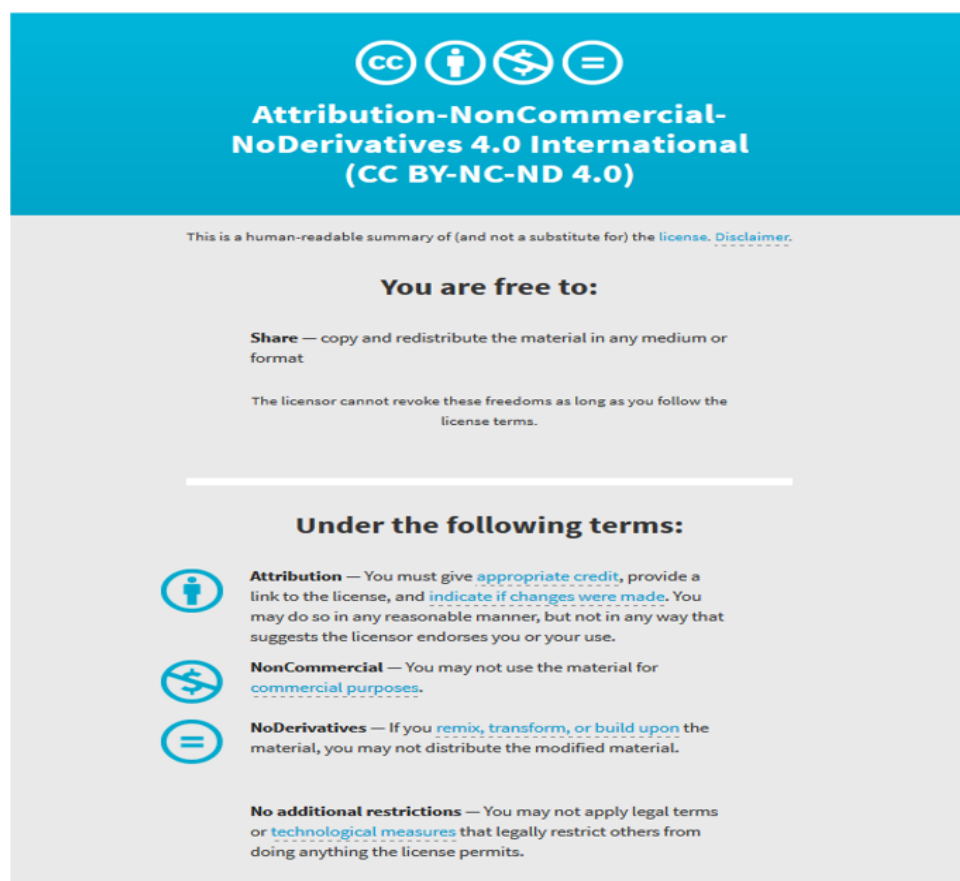
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ARVO Annual Meeting Abstract | June 2017

# Corneal deformation dynamics are associated with the retinal nerve fiber layer progression rate in glaucoma suspects and early manifest glaucoma patients

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## Abstract

**Purpose :** We investigated the association of corneal deformation dynamics and the rate of retinal nerve fiber layer (RNFL) progression in glaucoma suspects and early manifest glaucoma patients.

**Methods :** In this prospective study, consecutive patients from the Predicting Risk of Glaucoma: Relevant SNPs with Strong Association (PROGRESSA) Study, with optic disc appearances suspicious for glaucoma, performed a Humphrey 24-2 SITA Standard Visual Field (HVF) test. Enrolment required a mean deviation better than -6dB and using Hodapp-Anderson-Parrish criteria, mild or no glaucoma changes on HVF. Corneal deformation dynamics were assessed with the Corvis ST, a tonometer with visualization and measurement of the corneal response to an air pulse. Patients underwent spectral-domain OCT of the RNFL at baseline and 6-monthly for 3 years. OCT Guided Progression Analysis (GPA) measured the superior and inferior RNFL progression rate for each eye over 3 years in microns per year ( $\mu\text{m}/\text{year}$ ). Regression analysis, adjusted for intraocular pressure (IOP) and central corneal thickness, investigated the association of the Corvis ST parameters with the faster RNFL progression rate, either superior or inferior, in the right eyes of the patients.

**Results :** 198 eyes of 198 patients with a mean age of  $61.4 \pm 10.3$  years were recruited.

The mean baseline inferior and superior RNFL thicknesses were  $105.0 \pm 19.7 \mu\text{m}$  and  $100.3 \pm 16.5 \mu\text{m}$ . The mean rate of the faster RNFL progression, in the inferior or superior, was  $0.15 \pm 0.05 \mu\text{m}/\text{year}$  and  $0.12 \pm 0.04 \mu\text{m}/\text{year}$ , respectively. Regression analysis, adjusted for IOP and central corneal thickness, showed a significant association between the Corvis ST parameters and the faster RNFL progression rate, either superior or inferior, in the right eyes of the patients.

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superior rim, was  $-1.53 \pm 1.6 \mu\text{m}/\text{year}$ . The mean deflection length at applanation 2, the applanated part of the cornea on its return from the concave to convex position after the air pulse, was  $1.78 \pm 0.2 \text{mm}$ . This length and the Stiffness Parameter A1 (SP-A1), defined as [air pulse pressure at the corneal surface - biomechanical IOP]/deflection amplitude at applanation 1 (when cornea flattens from the convex position after the air pulse) were significantly associated with the rate of the faster RNFL loss ( $P= 0.002$  and  $0.022$ ;  $\beta= +0.25$  and  $-0.32$ , respectively).

**Conclusions :** Corneal deformation dynamics are associated with the rate of RNFL progression in glaucoma suspects and early manifest glaucoma patients. Such results could help individualize management of these patients.

This is an abstract that was submitted for the 2017 ARVO Annual Meeting, held in Baltimore, MD, May 7-11, 2017.

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