Author Response: Biomechanical Responses of Lamina Cribrosa to Intraocular Pressure Change Assessed by Optical Coherence Tomography in Glaucoma Eyes

Our recent publication noted several features of change in anterior lamina depth (ALD) with change in intraocular pressure (IOP) in glaucoma patients. ALD changed more in the lower ranges of IOP than at higher ranges, which represents the expected increased stiffening of biomaterials in regions of higher stress. Some eyes exhibited movement of the lamina out of the eye at lower IOP—a behavior that is more likely when the peripapillary sclera is more compliant. This was more common in eyes with less glaucoma damage. The regions of the lamina that moved more were in its vertical poles, above and below, as suggested by the lower density of connective tissue in the lamina there. Within an individual optic nerve head (ONH), there was greater displacement with IOP change in clock hours that retained more normal nerve fiber layer in the correspond-

As we and others have published, 20% of eyes have no clearly identifiable CSI using present technology. (2) The position of CSI has not been accurately automated and its subjective marking by human observers has a variance vary far greater than any putative movement of BMO. (3) CSI is not a smooth curve, so that selecting one arbitrary location along it (as Rebolloleda et al. have done) can give rise to significant variability from image to image. (4) The eye changes in axial length and curvature at the CSI with IOP change, so the claim that it is “better” ignores the fact that CSI is equally and potentially more mobile with IOP change than BMO. (5) In some eyes, the CSI reference position chosen by Rebolloleda et al. (3.5 mm from the disc center) leads to a reference line that practically runs right through the anterior lamina border, making its depth essentially zero when it clearly is posterior to the BMO inlet. In these eyes, a CSI reference plane would (artifactitiously) produce huge changes in ALD as a percent of baseline. (6) We measured and published choroidal thickness change in the macular zone of many of the patients in the present study. There is macular choroidal thickening of 2 to 3 μm/mm Hg lowering of IOP. By contrast, our peripapillary measurements of choroidal thickness at the BMO showed minor and variable change compared with those of the macular zone.

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References


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