Letters to the Editor

This agrees with other investigators\textsuperscript{1–3} who have demonstrated that decentration of the object, alteration of the eye to camera distance, and increasing ametropia can cause a large variation in the measured translaminar pressure gradient. This may have contributed to the difference in the measurements obtained. However, all the photographs were taken by the same observer, who took care to center the optic disc within the photograph to minimize this effect.

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\textbf{References}


\textbf{Influence of Cerebrospinal Fluid Pressure on the Lamina Cribrosa Tissue Pressure Gradient}

\textit{To the Editor:}

In the May 1995 issue of \textit{IOVS}, Morgan et al\textsuperscript{1} described that retrolaminar tissue pressure was largely dependent on the surrounding cerebrospinal fluid pressure, and they further speculated on the potential importance of the pressure gradient between the intraocular space and the retrolaminar tissue across the lamina cribrosa in humans.

I would like to point out to the authors that we also theorized on the potential importance of the translaminar pressure gradient in the intraocular, pressure-dependent dynamic changes of optic disc cupping\textsuperscript{2} and intraocular pressure-related pattern of optic disc cupping in adult patients with glaucoma.\textsuperscript{3}

"The IOP-dependent anterior-posterior displacement of the lamina cribrosa may reflect, in addition to the plasticity of the lamina cribrosa itself, an IOP-change induced shift in the balance between the pre-lamina pressure, that is, IOP, plus any prelamine tissue resistance and the retrolaminar intraoptic nerve pressure plus any retrolamina tissue resistance."\textsuperscript{3}

It is hoped that the potential importance of the translaminar pressure gradient in the pathophysiology of glaucoma underscored in this correspondence will help to generate the interest of others engaged in similar research. Morgan and his colleagues deserve to be commended for what I consider to be an important contribution toward the understanding of the pathophysiology of glaucoma.

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\textbf{The authors reply:}

We would like to thank Dr. Shin for his very positive comments regarding our article.\textsuperscript{1} We agree that the translaminar pressure gradient has potential importance regarding the pathophysiology of glaucoma as postulated by Volkov,\textsuperscript{2} Shin,\textsuperscript{3} and Morgan.\textsuperscript{1} We acknowledge the valuable contribution by Dr. Shin\textsuperscript{3} showing that changing intraocular pressure causes optic disc movement and alters the translaminar pressure gradient.

Pressure gradients across structures cause movement in the direction of, and stresses transverse to, the gradient (LaPlace’s law). A pressure gradient is the change in pressure per unit distance, which, in the case of the optic disc, we have shown to be approximated by \((\text{IOP} - \text{RLTp})/\text{LAW}\), where RLTp is retrolaminar tissue pressure and LAW is lamina axial width. Cerebrospinal fluid pressure seems to be the major determinant of retrolaminar tissue pressure. It is perhaps worth considering the role not only of retrolaminar tissue pressure and its effect on the translaminar pressure gradient, but also the axial width of the lamina cribrosa itself. A small axial width, which probably occurs in myopia, will tend to increase the translaminar pressure gradient and may be part of the reason for the predisposition toward glaucoma in persons with myopia (personal communication, R. Brubaker, Mayo Clinic). The magnitude of the translaminar pressure gradient may have significant effects on axonal transport, lamina connective tissue stresses, and blood flow down the central retinal vein and its laminar tributaries. Further consideration of factors affecting retro-