

The Influence of Age on Crystalline Lens Power Calculations

Several years ago we optimized the constants of three previously published lens power calculation methods (Bennett, Bennett-Rabbetts, and Stenström) using measured biometry and phakometry data.¹ Given the well-known tendency of the lens to increase its thickness and curvature with age, while at the same time reducing its equivalent refractive index,² it is conceivable that the constants used in these lens power calculations may have to be adjusted for age as well. To investigate this, we used the same cohort of 66 emmetropic eyes of 66 subjects (aged 19–69 years) from our previous works.^{1,2}

As before, we determined the lens power constants for each eye individually, both in case the lens power was calculated using only the anterior corneal surface¹ and using the total corneal power,^{3,4} and considered how these constants change with age. This demonstrated that all lens power constants had weak, but significant, correlation with age (Table). However, adjusting the lens power calculations to these age-dependent constants produced only minor improvements in the correlation with the lens power determined with phakometry, with a maximum of +0.01 for the Bennett-Rabbetts method. In adults, systematically including age correction to lens power calculations will therefore not lead to a meaningful improvement in accuracy with respect to the values determined by phakometry.

Jos J. Rozema^{1,2}
David A. Atchison³

¹Department of Ophthalmology, Antwerp University Hospital, Edegem, Belgium; ²Department of Medicine and Health Sciences, Antwerp University, Wilrijk, Belgium; and the ³School of Optometry and Vision Sciences and Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Queensland, Australia.
E-mail: Jos.Rozema@uza.be

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TABLE. Descriptive Statistics of the Individually Customized Constants for the Lens Power Calculation Methods, Along With Their Correlation and Regression With Age

Method	Constant	Mean ± SD (Range)	r (P)*	Regression	Δr (P ₁)†
Bennett	c ₁	0.571 ± 0.028 (0.499–0.643)	–0.262 (0.034)	–0.0005·Age + 0.5923	+0.003
	c ₂	0.378 ± 0.029 (0.311–0.438)	0.414 (0.001)	0.0008·Age + 0.3433	
BR (K _a)‡	c _{BR}	2.891 ± 0.778 (1.064–4.147)	0.322 (0.008)	0.0173·Age + 2.1563	+0.011
BR (K _{tot})§	c _{BR}	2.420 ± 0.812 (0.363–3.660)	0.284 (0.021)	0.0160·Age + 1.7411	+0.012
Stenström	c _{Sten}	2.875 ± 0.763 (1.088–4.145)	0.342 (0.005)	0.0181·Age + 2.1104	–0.003

BR, Bennett-Rabbetts.

* Pearson correlation with age.

† Change in Pearson correlation with phakometry lens power.

‡ BR constant for use with anterior corneal power.

§ BR constant for use with total corneal power.

