

**INTRAOCULAR PRESSURE THROUGH VARYING CONTACT
LENSES**

by

Teresa Marie Turner

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ABSTRACT

Purpose:

To evaluate the effect of newer contact lenses on IOP readings taken by NCT with the lenses in place on the eye.

Methods:

Non-contact tonometry readings were taken of both eyes before a lens was inserted, then again after a contact was inserted into the right eye only. Random lenses were chosen to undergo a third pressure reading after the lens was removed. The lenses tested included the Acuvue, Acuvue Bifocal, Acuvue Advance, Focus Night and Day, Focus Progressive, O2 Optix and Frequency 55 Multifocal. All lenses were -3.00D in power, and +1.50 or low add when appropriate.

Results:

This study showed minimal difference between control pressure readings and readings overtop of contact lenses in each of the lenses tried except for the higher dK Acuvue Advance, Focus Night and Day and O2 Optix. In each of these lenses there was a difference of 2mmHg or more.

Conclusions:

Common materials such as the etafilcon A, lotrafilcon A and methafilcon A have minimal effect on IOP using NCT. Higher dK, and lower water content lenses such as galyfilcon A, lotrafilcon B and lotrafilcon A all show lower IOP readings by 2mmHg or more as compared to pre-contact lens measurements.

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Intraocular Pressure through Varying Contact Lenses

As contact lens materials and designs are changing it is important to re-evaluate some basic principles that may otherwise be taken for granted. This study is designed to re-evaluate intraocular pressure using non-contact tonometry through new lens materials and designs. The purpose of this study is to establish a direction for further evaluation to build on.

Methods

Seven different lenses were chosen including Frequency 55 Multifocal, O2 Optix, Focus Progressive, Focus Night and Day, Acuvue Advance and Acuvue Bifocal. A standard Acuvue lens was also measured as a method of control. The Reichert AT550 Auto NCT was used for all measurements. A few assumptions were made including the reliability and repeatability of the NCT and symmetrical diurnal curves between each eye. A single reading of IOP was taken of each eye. If the readings were greater than 3mmHg different between each eye a second reading was taken. Only the second readings are recorded in the data. A lens was then chosen randomly and inserted into each right eye. A measurement was taken again of each eye. Three of the seven participants were then rechecked after removing the contact lens to determine effect of lens and eye manipulation during testing.

Lenses Parameters

Lens	Power	Base Curve	Diameter	Center Thickness	Material	Water Content	dK
Acuvue	-3.00	8.8	14.0	.07	Etafilcon A	58%	28.0

Acuvue Bifocal	-3.00/ +1.50	8.5	14.2	.075	Etafilcon A	58%	28.0
Acuvue Advance	-3.00	8.7	14.0	.07	Gatylfilcon A	47%	60.0
Focus Night and Day	-3.00	8.6	13.8	.08	Lotrafilcon A	24%	140.0
Focus Progressive	-3.00	8.6	14.0	.10	Nelfilcon A	69%	26.0
O2 Optix	-3.00	8.6	14.2	.08	Lotrafilcon B	33%	110.0
Frequency 55 Multifocal	-3.00/ +1.50	8.7	14.4	.08	Methafilcon A	55%	18.8

Results

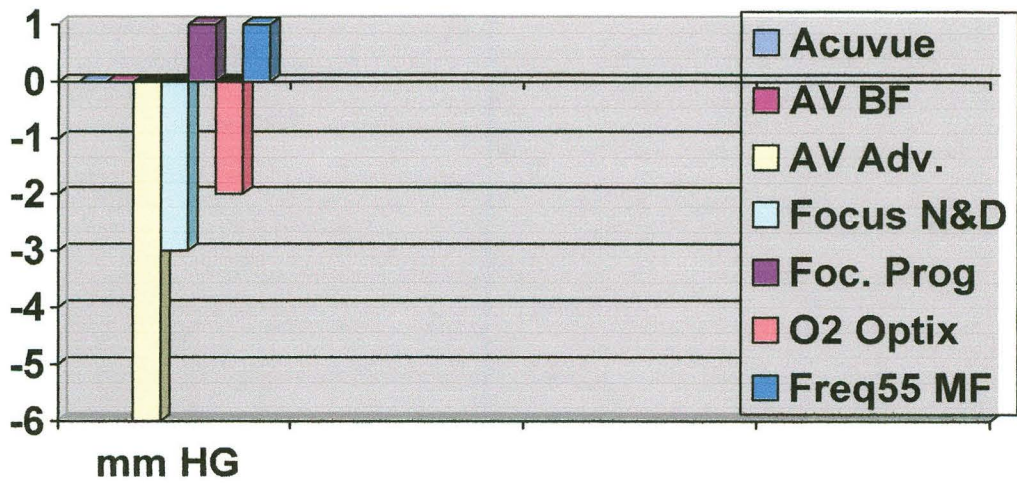
IOP readings ranged between 11 and 21mmHg, 15.4 mmHg average. Following are a series of tables that review testing findings.

Raw Numbers	IOP in mmHg before		IOP in mmHg with CL		IOP in mmHg after removal	
	Right	Left	Right	Left	Right	Left
Acuvue	18	19	17	18	12	15
Acuvue Bifocal	20	17	21	18		
Acuvue Advance	16	14	14	18		
Focus Night and Day	17	18	14	18		
Focus Progressive	17	15	19	16	17	n/a
O2 Optix	13	12	11	12		
Frequency 55 Multifocal	12	12	13	12	12	12

IOP difference after insertion of CL OD		
	Right	Left
Acuvue	-1	-1
Acuvue Bifocal	+1	+1
Acuvue Advance	-2	+4
Focus Night and Day	-3	0
Focus Progressive	+2	+1
O2 Optix	-2	0
Frequency 55 Multifocal	+1	0

IOP Difference Between OD and OS with CL in place OD	
Acuvue	0
Acuvue Bifocal	0
Advance Advance	-6
Focus Night and Day	-3
Focus Progressive	+1
O2 Optix	-2
Frequency 55 Multifocal	+1

Difference between IOP in Right and Left eye afer insertion of Contact lens OD



Discussion and Conclusions

The results showed a significant difference between IOP after inserting one of the higher dK, silicone hydrogel materials. The other lenses measured had a difference of 1mmHg or less. Past research indicates that hyperopic corrective lenses have greater effect secondary to increased central corneal thickness. The lenses used in this study were 1.0mm thick or less. Clinical implications point to the idea that further research needs to be done before reliably using IOP measurements through silicone hydrogel materials. Bifocal lenses appear to have little to no effect on IOP measurement.

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