

10-04	Feb 10	<b>Intraocular Pressure Measurement Precision with the Goldmann Applanation, Dynamic Contour, and Ocular Response Analyzers</b>
	Original Paper	

PMID	20122737
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Aachal Kotecha, Edward White, Patricio G. Schlottmann, David F. Garway-Heath,  
Ophthalmology (published online, Feb 2010)

Objective: To examine the repeatability and reproducibility of intraocular pressure (IOP) measurements obtained with the Goldmann applanation tonometer (GAT), the Pascal dynamic contour tonometer (DCT), and the Reichert Ocular Response Analyzer (ORA). A secondary objective was to assess agreement between the devices.

Conclusions: **The DCT shows excellent measurement precision, displaying the best repeatability and reproducibility of the 3 tonometers.** Corneal stiffness, as defined using CRF, was associated significantly with agreement between devices. The IOP measurements with each device are not interchangeable.

100 participants; a mixture of glaucoma suspects, patients, and control volunteers.

10-03	Jan 10	<b>Managing Glaucoma in Refractive Patients</b>
	Review Paper	

PMID	
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Sawat Salim, MD (Memphis, Tennessee)  
Review of Ophthalmology, January 2010, p 42-44

Discusses GAT measurement errors in post-refractive eyes. Recommends using DCT or ORA.

[http://www.revophth.com/index.asp?page=1\\_14571.htm](http://www.revophth.com/index.asp?page=1_14571.htm)

09-8	Apr 09	<b>Comparison of dynamic contour tonometry and Goldmann applanation tonometry and their relationship to corneal properties, refractive error, and ocular pulse amplitude.</b>
	Original Paper	

PMID	19329059
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Erickson DH, Goodwin D, Rollins M, Belaustegui A, Anderson C. (Pacific University College of Optometry, Forest Grove, Oregon 97116, USA.)

Optometry. 2009 Apr;80(4):169-74.

Purpose: This study examined the relationship between GAT and DCT as well as their relationship with corneal properties and ocular pulse amplitude (OPA).

CONCLUSION: DCT provides IOP measurements that are less dependent on corneal factors than GAT, aiding in diagnosis and treatment of patients with ocular hypertension and glaucoma. Additional studies are necessary to examine the relationship between OPA, refractive error, and IOP and its possible association with increased incidence of glaucoma in myopic patients.

115 healthy volunteers

09-29	Dez 09	<b>Tonometry: Comparison of five tonometers</b>
	Letter	

PMID	
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Comment by James Brandt on SY Hsu's paper  
International Glaucoma Review 11-3 December 2009

The study confirmed that the tonometers are highly correlated to each other, but each is affected by a different set of confounders. **All except DCT are influenced by CCT, lending support to the idea that this new form of tonometry is mostly unaffected by corneal characteristics such as thickness and rigidity.** One of the more interesting findings is the strong correlation between lens thickness and IOP measures acquired with the DCT. It is hard to postulate a physiologic or biomechanical reason why lens thickness should influence IOP measurements in normal eyes, and this interesting finding is worth further investigation.

<http://www.e-igr.com/ES/index.php?issue=113&ComID=720>

09-26	Dez 09	<b>Ocular rigidity, ocular pulse amplitude, and pulsatile ocular blood flow: the effect of intraocular pressure</b>
	Original Paper	

PMID	19608534
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Dastiridou AI, Ginis HS, De Brouwere D, Tsilimbaris MK, Pallikaris IG.

Invest Ophthalmol Vis Sci. 2009 Dec;50(12):5718-22. Epub 2009 Jul 15.

PURPOSE: The purpose of this study was to characterize the pressure-volume relation in the living human eye, measure the ocular pulse amplitude (OPA), and calculate the corresponding pulsatile ocular blood flow (POBF) in a range of clinically relevant IOP levels.

CONCLUSIONS: The present results suggest a nonlinear pressure-volume relation in the living human eye characterized by an increase in rigidity at higher IOP levels. The increased OPA and decreased pulse volume relate to the decreased POBF and the increased mechanical resistance of the ocular wall at high IOP levels.

METHODS: Fifty patients with cataract (50 eyes) were enrolled in the study. After cannulation of the anterior chamber, a computer-controlled device for the intraoperative measurement and control of IOP was used to artificially increase the IOP in a stepping procedure from 15 to 40 mm Hg. The IOP was continuously recorded for 2 seconds after each infusion step. The pressure-volume relation was approximated with an exponential fit, and the ocular rigidity coefficient was computed. OPA, pulse volume (PV), and POBF were measured from the continuous IOP recordings.

09-24 Okt 09 **Intraocular pressure in keratoconus.**  
Original Paper  
Read SA, Collins MJ. Contact Lens and Visual Optics Laboratory, School of Optometry, Queensland University of Technology, Brisbane, Queensland, Australia.  
PMID 19845560  
Acta Ophthalmol. 2009 Oct 20. [Epub ahead of print]

Purpose: This study aimed to investigate intraocular pressure (IOP) measurements taken using the dynamic contour tonometer (DCT) and the non-contact tonometer (NCT) in subjects with keratoconus.  
Conclusions: The measurements obtained with the DCT do not appear to be dependent upon corneal factors, unlike those taken with the NCT. The presence or severity of keratoconus was not correlated with DCT IOP values.  
20 keratoconus subjects and 20 age-matched control subjects

09-23 Okt 09 **Test-retest variability of intraocular pressure and ocular pulse amplitude for Dynamic Contour Tonometry: a multicenter study.**  
Original Paper  
Fogagnolo P, Figus M, Frezzotti P, Iester M, Oddone F, Zeppieri M, Ferreras A, Brusini P, Rossetti L, Orzalesi N. (IRCSS, Roma, Italy;)  
PMID 19833616  
Br J Ophthalmol. 2009 Oct 14. [Epub ahead of print]

AIMS: To assess the test-retest variability of intraocular pressure (IOP) and ocular pulse amplitude (OPA) measurements utilizing Dynamic Contour Tonometry (DCT) and to evaluate possible influential factors.  
DISCUSSION: DCT test-retest variability was almost perfect for IOP and good for OPA. Tonometry measurements with DCT tended to be overestimated compared to GAT.  
350 consecutive subjects (175 glaucoma, 175 control; one eye per subject) from 7 European centers.

09-19 Sept 09 **The relationship between diurnal variations in intraocular pressure measurements and central corneal thickness and corneal hysteresis**  
Original Paper  
Kotecha A, Crabb DP, Spratt A, Garway-Heath DF.  
PMID 19407025  
Invest Ophthalmol Vis Sci. 2009 Sep;50(9):4229-36. Epub 2009 Apr 30.

PURPOSE: To examine the relationship between office-hour changes in IOP, measured with the Goldmann applanation tonometer (GAT) and dynamic contour tonometer (DCT), and the corneal characteristics central corneal thickness (CCT) and corneal hysteresis (CH)  
CONCLUSIONS: Measured IOP and corneal characteristics covary during office hours. Changes in CCT and CH are associated with changes in GAT IOP and, less consistently, with DCT IOP. The data suggest that variations in corneal characteristics explain a small proportion of the change in IOP measurements made with the GAT during office hours.

09-16 Jul 09 **Applanation Tonometry Versus Dynamic Contour Tonometry in Eyes Treated With Latanoprost**  
Original Paper  
Efsthathios T, Detorakis, MD, PhD, Vasiliki Arvanitaki, MD, Ioannis G. Pallikaris, MD, PhD, George Kymionis, MD, PhD, and Miltiadis K. Tsilimbaris, MD, PhD  
PMID 19593199  
J Glaucoma. 2009 Jul 9. [Epub ahead of print]

Purpose: To examine the differences between Goldmann Applanation Tonometry (GAT) and Dynamic Contour Tonometry (DCT) associated with latanoprost use.  
Conclusions: The fact that dIOP was significantly higher in the Latanoprost group implies that latanoprost may affect the biomechanical properties of the ocular walls.

09-1 Jan 09 **[Influence of residual corneal bed thickness after myopic LASIK on intraocular pressure measurements. Goldmann applanation tonometry and dynamic contour tonometry] (in German)**  
Original Paper  
Muller L, Kohnen T. (Johann Wolfgang Goethe-Universität, Frankfurt am Main, Deutschland)  
PMID 19142646  
Ophthalmologe. 2009 Jan;106(1):21-8.

PURPOSE: The purpose of this study was to compare the influence of residual bed thickness after myopic ablation on intraocular pressure measurements using Goldmann applanation tonometry and dynamic contour tonometry.  
CONCLUSIONS: Thickness of residual bed appears to influence readings with Goldmann tonometry more than readings with dynamic contour tonometry after myopic LASIK.  
50 eyes before, 1 and 3 months after LASIK for myopia. LASIK surgery reduced the central corneal thickness by 71+/-27 microm. Differences in measurements with Goldmann tonometry were significantly correlated with thickness of residual bed after ablation, whereas measurements with dynamic contour tonometry were not.

08-48 Dez 08 **Accuracy of Goldmann, ocular response analyser, Pascal and TonoPen XL tonometry in keratoconic and normal eyes.**  
Original Paper  
Mollan SP, Wolffsohn JS, Nessim M, Laiquzzaman M, Sivakumar S, Hartley S, Shah S. (Birmingham and Midland Eye Centre, UK)  
PMID 18757471  
Br J Ophthalmol. 2008 Dec;92(12):1661-5. Epub 2008 Aug 29.

AIM: The aim of this study was to evaluate the practicality and accuracy of tonometers used in routine clinical practice for established keratoconus (KC).  
CONCLUSION: The DCT and the ORA are currently the most appropriate tonometers to use in KC for the measurement of IOPcc. Corneal factors such as CH and CRT may be of more importance than CCT in causing inaccuracies in applanation tonometry techniques.

08-31	Apr 08	<b>Intra- and Inter-examiner Reproducibility for Dynamic Contour<sup>®</sup>, Ocular Response Analyzer<sup>®</sup>, Goldmann, and Schiøtz Tonometry</b>
	Poster	
PMID		M. Sullivan-Mee, K.D. Halverson, G.A. Gerhardt. Albuquerque VA Medical Center ARVO 2008 Poster#: 713/D986

Comparison of test-retest reproducibility of GAT, Schiøtz, ORA, and DCT.

ORA and DCT demonstrated good to excellent reproducibility. Considering that the optimal intra-observer reproducibility for GAT-IOP has been suggested to be +/- 2.5 mm Hg, our results suggest that DCT and ORA can provide IOP estimates that are sufficiently reproducible to be usable in clinical practice.

120 eyes studied inter-examiner and intra-examiner.

Tonometer	Inter	Intra
GAT	0.93	0.86
DCT	0.41	0.88

08-04	Mai 08	<b>Assessment of true intraocular pressure: the gap between theory and practical data.</b>
	Review Paper	
PMID	18501267	Chihara E Surv Ophthalmol. 2008 May-Jun;53(3):203-18

In this article, previously reported theoretical equations about the effects of corneal topography, modulus of elasticity, and tear film on Goldmann applanation tonometric IOP readings were reviewed, and their discrepancies with clinical or experimental data were analyzed. Thereafter, new tonometers such as the dynamic contour tonometer, the rebound tonometer, and the ocular response analyzer were compared with the Goldmann applanation tonometer and other popular tonometers.

Recent epidemiologic studies show that a difference of only 1 mm Hg in the mean IOP may be critical enough to determine the visual field prognosis in patients with glaucoma. However, the Goldmann applanation tonometer, which is current gold standard, is not precise enough to measure the true IOP within an error of 1 mm Hg.

<http://www.ncbi.nlm.nih.gov/pubmed/18501267>

08-02	Jun 08	<b>Dynamic Contour Tonometry in Comparison to Intracameral IOP Measurements.</b>
	Original Paper	
PMID	18316699	Boehm AG, Weber A, Pillunat LE, Koch R, Spoerl E Invest Ophthalmol Vis Sci. (IOVS) 2008 Jun;49(6):2472-7. Epub 2008 Mar 3

CONCLUSIONS: Measurements with the DCT showed good concordance with intracameral IOP. At IOP of 15 mm Hg, the mean difference between IOP measured by DCT and intracameral IOP was -0.02 +/- 1.32 mm Hg; at 20 mm Hg it was -0.2 +/- 1.44 mm Hg and at 35 mm Hg, -0.84 +/- 1.90 mm Hg.

75 eyes of 75 patients undergoing phacoemulsification were examined. Before phacoemulsification, the anterior chamber was cannulated at the temporal corneal limbus. In a closed system the IOP was directly set to 15, 20, or 35 mm Hg with a manometric water column. IOP measurements taken by DCT were compared to intracameral measurements with a precision reference pressure sensor. **This paper provides the conclusive proof: PASCAL measures true IOP!**

<http://www.ncbi.nlm.nih.gov/pubmed/18316699>