

COMPARISON OF ACCURACY OF DIATON TRANSPALPEBRAL TONOMETER VERSUS GOLDMANN APPLANATION TONOMETER, DYNAMIC CONTOUR TONOMETER AND OCULAR RESPONSE ANALYZER

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PURPOSE

To compare intraocular pressure measurements obtained with the diaton transpalpebral tonometer with those from ocular response analyzer (ORA), dynamic contour tonometry (DCT) and Goldmann applanation tonometry (GAT) in patients diagnosed with primary open-angle glaucoma (POAG) and glaucoma suspects, and to determine the effects of central corneal thickness (CCT) and corneal hysteresis (CH) on intraocular pressure (IOP) measurements with these devices

PATIENTS

40 patients (80 eyes) age 42-83 years with POAG and glaucoma suspects were included in the study.

Research exclusion criteria:

- Patients with recent eye surgery;
- Patients with cornea, sclera or lid pathology;
- Patients with high myopia or hypermetropia;
- Patients with visual acuity less than 0,1

METHODS

IOP was estimated using:

Goldmann applanation tonometer (shin nippon, Japan),



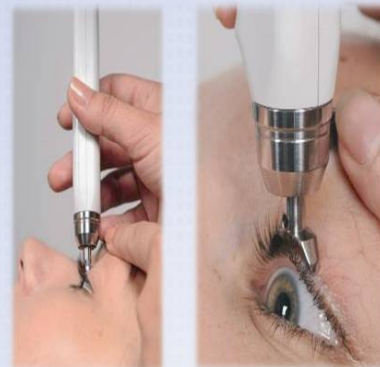
Ocular Response Analyzer (Reichert, USA),



Dynamic Contour Tonometer (Ziemer ophthalmic systems, Switzerland),



Transpalpebral Non-corneal Tonometer Diaton (GRPZ, Russia)



Diaton Tonometry is a new Non-Corneal approach to measuring IOP through the eyelid

- IOP measurement with Diaton can be realized the patient being in sitting position
- The measurement is realized through the upper eyelid and over the sclera, not the cornea

- ▶ CCT was estimated using ultrasonic pachymeter that was built-in ORA
- ▶ The average of ORA (corneal compensated IOP [IOP-ORAcc] and Goldmann-correlated IOP [IOP-ORAg]), DCT, GAT, and Diaton tonometer levels were compared and the devices were examined with respect to CCT and CH
- ▶ Spearman's correlation tests were used for statistical analysis

RESULTS

- ▶ Mean CCT was 561,2±32,4µm and mean CH was 10.6+/-2.0 mmHg
- ▶ Mean IOP, measured with the tonometers that were used in the research

	IOP, mmHg	
	M ± σ	Min/max
GAT	18,4±4,1	11/31
ORA IOPg	18,4±3,5	12,6/28,0
ORA IOPcc	18,2±3,4	10,5/29,7
DCT	18,9±4,1	10,1/33
Diaton	17,0±3,0	10/28

Correlated rates relations

	DIATON	ORA IOPcc	DCT	GAT
DIATON		0,96	0,87	0,61
ORA IOPcc	0,96		0,89	0,56
DCT	0,87	0,89		0,73
GAT	0,61	0,56	0,73	

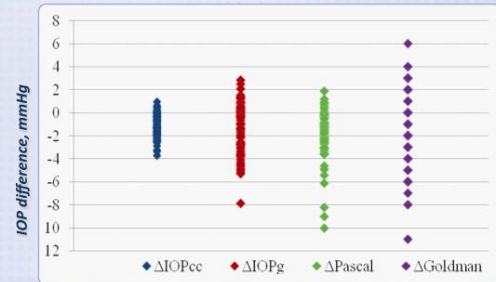
0,96	0,87	0,89	0,61
0,96		0,89	0,56
0,87	0,89		0,73
0,61	0,56	0,73	

The performed analysis of correlation between IOP meanings shows high conformity of results of Diaton with IOP-ORAcc and DCT

The differences between the measurements of DCT, ORA and Diaton were statistically significant

It should be noted that the maximal conformity of indexes of transpalpebral tonometry was found with the indexes of the techniques that are positioned as the independent from the biomechanical cornea characteristics. The unreliable difference between the cornea-compensated IOP and the tonometry index of contour tonometer confirms high accuracy of these techniques of IOP estimation. The results of transpalpebral tonometry correlate well with the IOPcc and the results of contour tonometer than the results of Goldman Applanation tonometer.

Difference between indexes of Diaton and other tonometers that were used during the study



The differences between the measurements of DCT, ORA and Diaton were statistically significant

CONCLUSIONS

Transpalpebral Tonometry is an accurate method of IOP measurement that is also independent from the biomechanical characteristics of cornea.

It can be recommended for IOP measurements of patients diagnosed with glaucoma including those cases where cornea pathology or cornea characteristics have been altered